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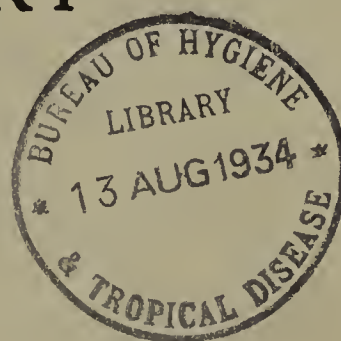
Municipality of Singapore

HEALTH DEPARTMENT.

ANNUAL REPORT

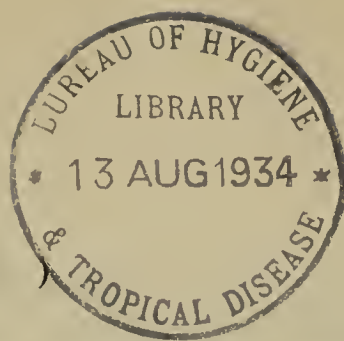
for

1933



LITHOGRAPHERS LIMITED,
SINGAPORE.
1934.

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HEALTH DEPARTMENT.

SINGAPORE, 6th April, 1934.

THE PRESIDENT,

MUNICIPAL COMMISSIONERS,

SINGAPORE.

SIR,

I have the honour to submit my report for 1933.

I. ZYMOTIC DISEASE.

1,780 cases were notified compared with 1,660 in 1932 and 1,416 in 1931.

The following table shows the comparison between the year under review and the previous ten years:—

Year	Enteric Fever	Diphtheria	Chicken-pox	Puerperal Fever	Erysipelas	Cerebro Spinal Fever	Paratyphoid Fever	Small-pox	Plague	Cholera	Typhus Fever	Scarlet Fever	Tuberculosis	Total
1923 ..	63	37	188	12	14	9	1	3	52	—	—	—	409	788
1924 ..	64	38	230	22	9	16	—	9	20	11	—	—	331	750
1925 ..	136	51	31	14	2	10	2	10	59	1	—	—	365	681
1926 ..	197	46	169	25	14	6	1	34	7	22	1	1	642	1,165
1927 ..	235	29	193	22	5	17	7	19	4	30	—	—	733	1,294
1928 ..	230	59	350	11	8	15	12	9	5	9	1	3	808	1,520
1929 ..	133	57	577	13	8	3	—	9	3	—	—	6	904	1,713
1930 ..	156	63	349	11	9	22	2	—	—	—	—	2	965	1,579
1931 ..	150	65	211	28	6	8	1	3	—	—	—	—	944	1,416
1932 ..	114	124	542	16	2	6	1	8	—	—	—	1	846	1,660
Average for 10 years ..	147.8	56.9	284	17.4	7.7	11.2	2.7	10.4	15	7.3	.2	1.3	694.7	1256.6
1933 ..	248	244	288	11	5	4	7	1	1	—	1	—	970	1,780

The following table shows the incidence by nationalities:

DISEASE	Europeans	Eurasians	Chinese	Malays	Indians	Others	TOTAL
Enteric Fever ...	3	21	175	4	37	8	248
Diphtheria ...	6	22	187	10	17	2	244
Chicken-pox ...	9	21	35	22	196	5	288
Puerperal Fever ...	—	—	9	—	1	1	11
Erysipelas ...	—	—	4	—	1	—	5
Cerebro-Spinal Fever	—	—	2	—	2	—	4
Paratyphoid ...	1	1	4	—	1	—	7
Small-pox ...	—	—	—	—	1	—	1
Plague ...	—	—	—	—	1	—	1
Typhus Fever ...	—	—	—	1	—	—	1
Scarlet Fever ...	—	—	—	—	—	—	—
Tuberculosis ...	2	22	748	64	115	19	970
Total ...	21	87	1,164	101	372	35	1,780

The following return shows the number notified for each month of the year.

DISEASE	January	February	March	April	May	June	July	August	September	October	November	December
Enteric Fever ...	3	6	18	16	32	17	14	29	37	27	29	20
Diphtheria ...	18	25	17	20	31	26	11	18	10	22	20	26
Chicken-pox ...	30	29	47	43	37	15	34	9	7	14	9	14
Puerperal Fever ...	1	1	2	2	—	2	1	—	1	—	—	1
Erysipelas ...	1	—	—	—	—	—	—	—	2	2	—	—
C.-Spinal Fever ...	—	—	—	—	—	—	2	—	—	1	1	—
Paratyphoid ...	—	—	—	—	1	1	2	—	1	1	1	—
Small-pox ...	—	—	—	—	—	1	—	—	—	—	—	—
Plague ...	—	—	—	1	—	—	—	—	—	—	—	—
Cholera ...	—	—	—	—	—	—	—	—	—	—	—	—
Typhus Fever ...	—	—	—	—	—	—	—	1	—	—	—	—
Scarlet Fever ...	—	—	—	—	—	—	—	—	—	—	—	—
Tuberculosis ...	61	89	88	74	83	87	87	88	89	89	67	68
Total ...	114	150	172	156	184	149	151	145	147	156	127	129

The outstanding feature of these tables is still, I am glad to report, our continued freedom from Cholera, Small-pox and Plague. The last case of Cholera occurred in 1928, while during the year under review there was only one case of Small-pox and one of Plague.

The case of Small-pox was discovered on 30th June. The patient was an Indian labourer who, it was established, had arrived from India on 17th June. As he had obviously been ill for some time before he was discovered his infection was undoubtedly contracted elsewhere. The patient, who bore no definite signs of previous vaccination, died.

The Plague case was that of a Bengali watchman in Boat Quay reported on 23rd March. During disinfection of the premises several dead and decomposed rats were found. Though the *B. Pestis* was not recovered from any of these, there were obvious signs they had only recently died. Two days later one plague infected animal was found. It is worth recording that routine rat-trapping is always carried out in this district, and, during January, February and March 48 rats had been so trapped here and examined without finding any signs of rat plague. The infected premises are used as a warehouse and at the time contained foodstuffs—mostly rice—which had recently been imported from Calcutta and Rangoon. The last case of Plague in Rangoon occurred during the week 5th/11th March.

With regard to Plague generally, the usual routine rat-trapping was carried out during the year. 5,179 rats were dissected in the laboratory but with the exception recorded above no rats were found to be plague-infected. Further particulars will be found in the Bacteriologist's report.

TYPHOID AND PARATYPHOID FEVERS.

255 (7 Paratyphoid) cases were notified against 115 in 1932 and an average of 147.8 for the previous ten years. 86 deaths were recorded from this cause.

The yearly notifications of attacks have never given any indication of the real prevalence of the disease in Singapore as I am quite confident that many cases occur in that large body of the population, which never has recourse to Western medical methods, and are in consequence never recognised nor treated. Nor should the fact that there were more than usual notified during the year be taken to mean that the disease was more prevalent. It so happened that early in the year many notifications were of school children, which luckily caused some disquietude and served to concentrate some much needed public attention on the disease. It is quite likely that the extra care taken both by parents and practitioners, plus our own investigations resulted in many cases being diagnosed and treated that would otherwise have escaped serious attention.

84 notifications of Typhoid in school children were received throughout the year. These school cases were very thoroughly and patiently investigated by Dr. Canton and the results obtained were illuminating and convincing.

One school, St. Joseph's, had 19 cases in April, May and June. The houses of all these pupils were visited but in no instance was a second case found in a house, nor was there any history suggestive of a recent attack of the disease in any other member of the family. As the houses of the pupils were scattered all over the town this immediately suggested

the source of infection as being at the school. With the added knowledge that most of the children obtained their lunch from food-hawkers who frequented the school compound, the field of investigation was further narrowed, and our attention was naturally focussed on these hawkers. Accordingly 33 hawkers selling at this school were admitted to Middleton Hospital and examined as to their "carrier" state. One was found to be excreting the Typhoid organism. He himself stated that he sold mainly at this school but, to clinch matters, the affected children were shown the photographs of several hawkers, and 8 out of 13 invalids were emphatic in stating that they had bought food from the "carrier" within a month of the onset of their illness.

It is also worthy of note that 10 of the 13 invalids also recognised an iced water seller as one from whom they had bought cold drinks. And though he was not found infected it is significant that he lived with 29 other food-hawkers in a house in Bencoolen Street, and, of these 29 one was the "carrier".

Further, of the 30 hawkers in this house, 5, of whom the carrier was one, sold at St. Joseph's School with its 19 cases of Typhoid, 2 sold at the Convent which had 6 cases in the same period, 2 sold at the Le Mercier school which had one case, and 4 sold at the Methodist Girls' School which had 8 cases.

When one realises that in addition to the 30 hawkers there were 55 other occupants of the house in Bencoolen Street and that the school children formed but a small part of the hawkers' clientele one trembles to think of the many more cases of unrecognised Typhoid this one "carrier" most likely caused.

During August and September 13 school children living in Emerald Hill district were notified as suffering from Typhoid. As they came from different schools and as, in addition, 11 adults were also notified as suffering from the disease in this area it was evident this was more likely to be a district infection rather than a school infection. Attention was focussed then on the hawkers plying their trade in the district. On one day in a matter of three hours 120 food-hawkers were found selling in Emerald Hill Road. They gave home addresses all over the town, many of them in distant parts. But as the cases were limited to the district the likelihood was that the hawker, if such was the culprit, was actually resident in the area. Accordingly 208 hawkers living in the district were detained and examined and immediately one "carrier" was found. The investigation was pursued but, as with the isolation of the "carrier" no fresh cases appeared, it was dropped. In this district alone particulars of 362 food-hawkers were taken and Dr. Canton ends his report by saying that he thinks it is no exaggeration to say that between 600 and 700 hawkers daily perambulate this district!!

The above short resume of the investigations gives no indication of the tremendous amount of careful work put into it, but I take this opportunity of congratulating Dr. Canton for the very efficient way in which he carried it out and for the very substantial and convincing results which he obtained.

I am particularly pleased with the results if only for personal reasons. For ten years now I have been preaching against the food-hawker and his insanitary methods of preparing, handling and distributing food. The evidence against him hitherto, to untrained minds at least, has only been

hypothetical but now the case against him should be clear even to the most sceptical. My pleadings have been received with, almost hostility, in unexpected quarters, often with disbelief and always, I am afraid, with apathy. So much so that to-day there is no better control of the food-hawker than there was ten years ago and his numbers have multiplied. And in spite of what I have said and written the position to-day is that almost literally anyone, short of an obvious leper, can apply to the appropriate department, and for the annual sum of one dollar can receive a licence which allows him legally to disseminate disease and death throughout the town, in the manner of the two "carriers" just mentioned.

With a water supply that is second to none and a milk supply that is 95% tinned, quite apart from all other epidemiological evidence, the only source of our Typhoid, and for that matter of our Dysentery which in 1933 caused 325 deaths, must be a pre-existing case or a "carrier". And the infection can only be conveyed through the medium of food. And though I do not say that all "carriers" of these diseases are hawkers of food I do say that should a "carrier" be of that fraternity there is literally no check on his potentialities as a spreader of disease and death. The results of this investigation prove this beyond all contradiction and, if, in the face of this evidence, we are still unwilling to grasp the nettle without fear or favour then we have little hope of reducing the incidence of either of these diseases.

TUBERCULOSIS.

There were 970 notifications of this disease throughout the year but as the deaths from this cause numbered 1189 it seems there is little benefit in having the disease compulsorily notifiable.

The figure 1,189 represents 12.66% of all deaths. The corresponding figures for 1932 were 1,088 and 11.47%.

Of the 1,189 deaths, 1,094 were recorded as Tuberculosis of the Lungs so that it can reasonably be said that our slums are, in the main, responsible for the continued high incidence of this disease.

So far the activities of the Improvement Trust have made but little impression on this problem which it was formed primarily to solve and I am afraid that until there is a complete change of heart on the part of the public progress in the future must be very slow indeed.

Recently the Improvement Trust declared a big block of houses insanitary and unfit for human habitation. While, at the subsequent enquiry, it was perhaps to be expected that many of the legal profession would be ranged against us, it was a surprise to me that any other professional men could be found to say that the hovels in question—back to back buildings, sunless and badly ventilated, with no facilities for cooking, washing and modern drainage, were habitable. The Commissioners byelaws provide better housing for pigs.

I am afraid most of the owners and others financially interested in our slum property take but little interest in it and very rarely see it. Everything that is done to make it more insanitary is laid to the tenant's account. And he, struggling to spread the burden of the heavy rent which this type of property from its central position can command even in these days of slump, is hardly to be blamed if he crowds more and more insanitary cubicles into it. I promise that in future, so far as I may, it will be the owner who will be harrassed with our notices and not the tenant.

This is neither the time nor the place to discuss the whys and wherefores but what it seems to boil down to is this viz. that the present insanitary property has a grossly inflated value on account of its being overcrowded, and it cannot be improved except at considerable outlay. If owners are not to be made to pay at least in part then the funds at the disposal of the Improvement Trust are quite inadequate.

DIPHTHERIA.

244 cases were notified as against 124 in 1932 and an average of 56.9 for the previous ten years.

Though I have frequently stated my belief that Diphtheria is much more prevalent than is generally supposed I do not think that the almost doubled notifications should be taken to mean an unusual or increasing prevalence. Rather do I think, and hope, it is an indication on the part of both parents and practitioners that they are taking rather more seriously the many cases of sore throat from which the children undoubtedly suffer. Perhaps, too, the increased notifications may in part be due to the Infant Welfare Visitors who have been instructed to obtain throat swabs in all doubtful cases of babies under one year, and to advise mothers what to do in the case of older children who do not come immediately under their care. Of 104 such swabs taken 7 were positive.

Much more care, too, is taken by the Department in following up contacts in houses from which cases were notified, and this has undoubtedly helped to swell the numbers. Of 541 swabs taken from such contacts 58 or 10% were positive. These positives were either taken to Hospital or treated by medical practitioners, and it is worthy of note that no subsequent case occurred in any of the infected houses.

The practice was also continued throughout the year of taking throat swabs in all cases of deaths of children under ten, who had not been seen in life by a medical man. Of 827 such swabs examined 32 were returned as positive. 15 of the children were under one year and 28 under 5. In one positive case where the death was recorded as due to Pneumonia subsequent examination of contacts revealed an acute Diphtheria in an older child.

Further interesting observations on Diphtheria and the causative organism will be found in the Bacteriologist's reports on the Middleton Hospital and Bacteriological laboratory.

None of the other infectious diseases call for special comment.

GENERAL.

1. Medical inspection of Passengers.

15 permits to land were granted to 15 passengers, 3 of whom failed to report.

2. Disinfection of infected articles.

935 articles were disinfected. The steam disinfecter was used on 10 occasions only.

3. Houses quarantined and disinfected.

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5 houses were quarantined. 672 houses (371 Phthisis cases) were disinfected.

4. Infected persons and contacts.

352 persons were removed to Middleton Hospital. 57 bodies were buried under supervision.

II. MIDDLETON HOSPITAL.

At the end of the previous year there were 28 patients remaining in hospital while during the year under review there were 1,160 admissions making a total treated of 1,188. Of these, 1,072 were discharged, 75 died, while 41 remained in hospital at the end of the year.

Dr. Gilmour's full report is appended.

III. VACCINATION.

The following vaccinations were reported:

	Successful	Modified	Failed	Not Seen	TOTAL
Municipal Vaccinators ...	11,374	11	15	52	11,452
Private Vaccinators ...	796	—	2	—	798
Medical Men ...	2,396	—	12	—	2,408
Total ...	14,566	11	29	52	14,658

Of the total number of 11,452 vaccinations performed by the Municipal Vaccinators, 99% of those seen for the second time were found to be successful.

The nationalities of those vaccinated by Municipal Vaccinators were Europeans 9, Eurasians 140, Chinese 9,247, Malays 1,186, Indians 647 and Others 223. Of these 5,909 were males and 5,543 females of the following ages:—

Under 1 year	..	..	..	10,428
1 to 2 years	..	..	..	159
3 to 5 years	..	..	..	284
6 to 10 years	..	..	..	268
11 to 20 years	..	..	..	235
Over 20 years	..	..	..	78
Total	..	..	..	11,452

8,907 vaccinations were performed at our depots, 1,982 at Police Stations, 427 in the Child Welfare Clinics, and 136 in private houses.

Of the above 53 were contacts.

VITAL STATISTICS.

The following statistics are calculated on an estimated mean annual population of 477,380 made up as follows:—

	MALE	FEMALE	TOTAL
Europeans ..	4,248	2,518	6,766
Eurasians ..	3,036	3,297	6,333
Chinese ..	226,501	141,281	367,782
Malays ..	24,574	21,017	45,591
Indians ..	35,415	7,546	42,961
Others ..	4,544	3,403	7,947
Total ..	298,318	179,062	477,380

This mean annual population was arrived at by simply adding the excess of births over deaths in 1932 to the estimated population for that year.

In my two previous reports I discussed the population figures at some length and I pointed out, shortly, how difficult it is to arrive at a reliable estimate of population in intercensal years for such a “clearing” port as Singapore. With the bulk of the people illiterate, irresponsible and evershifting, the ordinary methods in use at home are not available. Several methods of estimating for the Intercensal years were recommended in the 1931 Census Report but it seems to me they depend on such variable factors that the resulting figures are liable to be just as fallacious as those obtained by the simple method I have adopted.

In view of the above, the calculation of the figure for the mean annual population, whether for the purpose of my Annual Report or for the ordinary weekly statistical returns always causes me many doubts and qualms especially in view of our continued declining death-rate. At the same time in so far as I am concerned with the formulation of measures designed to improve or protect the Public Health it does not really matter what the actual population is, within reasonable limits, provided I can be sure I am not grossly overstating it from year to year and thus showing too low a death-rate. And if my 1932 estimate was reasonably accurate then I am confident my 1933 figure is not overstated. In 1933 the total number of births was 16,881 against 16,589 for 1932, showing that the married section of the population at least did not decline. The sex ratio at the 1931 Census was at the rate of 100 females to 176 males and the number of births in that year was 16,488 so that the ratio of females to males should not have materially altered. It is surely safe, therefore, to assume that if there has been any large variation of the population between 1932 and 1933 it could only have taken place in the ‘non family section.’ But there was no particular evidence of any such reduction nor was there any particular reason throughout the year for such a reduction. The full effects of the slump were over as far as repatriation of unemployed was concerned. Indeed in the last few months of the year there were signs of improvement in the labour conditions.

Further, departmental arrangements to enable us to take snap censuses of special blocks were completed early in the year. The population of much of the congested areas was so enumerated and it was found that there was at least a 10% increase in the population of these areas over the 1931 Census. This further rebuts the argument that there has been any material fall in our population since that Census was taken.

For these and other reasons then I am satisfied that the estimated population for the year was reasonably accurate as compared with that for 1932 and therefore any comparison of the statistics for these years is fair and reliable.

The following return gives the population, the number and rates per 1,000 births, infantile deaths and deaths at all ages for the past 10 years:—

Year	Population	Births		Infantile deaths		Deaths at all ages		
		No.	Rate	No.	Rate	No.	Rate	
1923	...	373,513	10,757	28.79	2,431	225.9	10,049	26.90
1924	...	384,758	11,757	30.55	2,614	222.3	10,420	27.08
1925	...	396,341	12,363	31.19	2,600	210.3	11,184	28.21
1926	...	408,273	12,871	31.52	2,987	232.0	13,085	32.04
1927	...	428,153	14,152	33.05	3,221	227.6	14,165	33.08
1928	...	442,454	15,540	35.12	3,142	202.1	12,584	28.44
1929	...	479,723	17,551	36.58	3,467	197.5	12,576	26.21
1930	...	495,818	17,702	35.70	3,877	219.0	13,748	27.73
1931	...	445,719	16,488	36.99	3,369	204.3	11,233	25.20
1932	...	470,271	16,589	35.28	2,994	180.5	9,480	20.12
Average for 10 years	...	432,502	14,577	33.48	3,070	212.2	11,852	27.50
1933	...	477,380	16,881	35.36	2,980	176.5	9,387	19.66

I. BIRTHS.

The total number of births registered during the year was 16,881 compared with 16,589 in 1932 and 16,488 in 1931.

There were 8,840 male and 8,041 female births.

The crude birth rate was 35.36 per mille as compared with 35.28 in 1932 and 36.99 in 1931.

The following return gives the number of births and the birth rate for each month of the year:—

Month		Births	Birth Rate	Month		Births	Birth Rate
January	...	1,362	34.24	July	...	1,280	32.18
February	...	1,217	30.59	August	...	1,356	34.08
March	...	1,491	37.48	September	...	1,458	37.77
April	...	1,393	35.02	October	...	1,547	38.89
May	...	1,496	37.60	November	...	1,495	37.58
June	...	1,424	35.80	December	...	1,362	34.12

The following return shows the number of births for each nationality:—

				Males	Females	Total
Europeans	...	...	...	90	92	182
Eurasians	...	...	...	89	59	148
Chinese	...	...	...	7,067	6,393	13,460
Malays	...	...	...	889	798	1,687
Indians	...	...	...	595	572	1,167
Others	...	...	...	110	127	237
Total				8,840	8,041	16,881

There were 431 still births compared with 467 in 1932 and 493 in 1931.

II. DEATHS.

The total number of deaths for the year was 9,387 and the death rate 19.66 per 1,000 compared with 20.12 in 1932 and 25.20 in 1931.

220 persons died who had been less than 3 months resident in Singapore. Deducting these, the death rate is reduced to 19.20.

The excess of births over deaths was 7,494.

The following return shows the number of deaths and the death rate for each month of the year:—

Month	Deaths	Death Rate	Month	Deaths	Death Rate
January	785	19.67	July	805	20.17
February	712	19.75	August	758	18.99
March	682	17.09	September	761	19.70
April	738	19.11	October	798	20.06
May	831	20.82	November	776	20.09
June	841	21.77	December	900	22.55

The death rates for the different nationalities were:—

	1933			1932		
	Males	Females	Total	Males	Females	Total
Europeans	6.59	5.16	6.06	9.05	3.27	6.92
Eurasians	15.48	13.95	14.69	12.76	13.20	12.99
Chinese	20.21	19.96	20.11	21.05	20.29	20.76
Malays	24.25	22.03	23.23	23.82	23.97	23.89
Indians	12.20	32.87	15.83	12.91	27.78	15.43
Others	14.08	15.57	14.72	14.25	12.30	13.42
Total	19.28	20.34	19.66	19.94	20.51	20.12

The following return gives the number of deaths from each cause of disease, by nationality, age and sex. The classification followed is that of the 1931 International List:—

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

[illegible]

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

I. Infectious and Parasitic Diseases—(contd.)		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals		
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F
23. Tuberculosis of the respiratory system.	Brought forward	Europeans	105	94	19	9	34	40	28	24	13	12	21	9	27	11	67	28	77	22	77	29	60	17	...	...	528	295	823	
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24. Tuberculosis of the central nervous system.	Europeans	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	1	...	3	4	2	9	...	2	...	1	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25. Tuberculosis of intestines and peritoneum.	Europeans	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
26. Tuberculosis of vertebral column.	Europeans	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
27. Tuberculosis of other bones and joints.	Europeans	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28. Tuberculosis of genito-urinary system.	Europeans	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32. Disseminated tuberculosis.	(a) Acute.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(c) Not distinguished as acute or chronic.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carried forward			106	94	24	19	48	62	36	33	16	16	40	26	89	33	294	122	297	86	296	84	149	42	...	...	1,395	617	2,012	

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

I. Infectious and Parasitic Diseases—(contd.)		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
33. Leprosy.		<i>Brought forward</i>	106	94	24	19	48	62	36	33	16	16	40	26	89	33	294	122	297	86	296	84	149	42	1,395	617	2,012
		
		
		
		
34. Syphilis.	(a) Congenital Syphilis.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		34	41	16	11	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		
	(b, c) Syphilis acquired or Unspecified.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		
		
		
		
36. Purulent infection, Septicæmia.	(a) Septicæmia.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		5	5	4	5	5	5	1	...	...	...	...	1	...	2	3	4	2	...	...	...	...	3	...	...	...	...	...
		
		
		
	(b) Pyæmia.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		
		
		
		
38. Malaria.	(c) Gas gangrene.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		
		
		
		
40. Ankylostomiasis.		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		
		
		
		
<i>Carried forward</i>		147	145	49	41	66	75	48	54	25	26	49	35	109	43	373	158	378	122	363	105	192	63	...	...	1,799	867	2,666

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

I. Infectious and Parasitic Diseases—(contd.)		Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals
				...	...	...	...	...	...	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
42. Other diseases due to helminths.		<i>Brought forward</i>		147	145	49	41	66	75	48	54	25	26	49	35	109	43	373	158	378	122	363	105	192	63	...	...	1,799	867	2,666
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	9	7	1	4	1	...	1	...	...	...	...	2	...	...	...	...	...	...	...	...	14	11	...
		Malays		...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...
(2) Other mycosis.		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...
44. Other infectious or parasitic diseases.	(6) Other diseases included under 44.	Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
45. Cancer of the buccal cavity and pharynx		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
46. Cancer of the digestive organs and peritoneum.		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
47. Cancer of the respiratory organs.		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
48. Cancer of the uterus.		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Carried forward</i>				147	145	49	41	76	82	49	59	26	26	50	35	112	43	380	161	406	130	422	117	219	85	...	...	1,936	924	2,860

II. Cancer and Other Tumours.

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

II. Cancer and Other Tumours—(contd.)																														Grand Totals	
	Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL.					
		M		F		M		F		M		F		M		F		M		F		M		F		M		F			
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
49. Cancer of other female genital organs.	Brought forward	147	145	49	41	76	82	49	59	26	26	50	35	112	43	380	161	406	130	422	117	219	85	...	...	1,936	924	2,860	
	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
50. Cancer of the breast.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
51. Cancer of the male genito-urinary organs	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
52. Cancer of the skin.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
53. Cancer of other or unspecified organs.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
54. Non-malignant tumours.	(a) Female genital organs.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
55. Tumours of undetermined nature.	(a) Female genital organs.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(b) Other sites.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carried forward	...	147	145	49	41	77	83	49	59	26	26	52	37	114	43	383	165	409	142	430	130	223	91	...	...	1,959	962	2,921	

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

III. Rheumatism, Diseases of Nutrition and of Endocrine Glands and Other General Diseases.										Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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56. Rheumatic Fever.										Brought forward										147	145	49	41	77	83	49	59	26	26	52	37	114	43	383	165	409	142	430	130	223	91	1,959	962	2,921																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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57. Chronic rheumatism, osteoarthritis.																			</

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

III. Rheumatism, Diseases of Nutrition and of Endocrine Glands and Other General Diseases—(contd.)			Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals			
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F				
66. Diseases of the thyroid and parathyroid glands.	(a) Simple goitre.	<i>Brought forward</i>	...	145	53	44	...	...	79	84	49	64	29	26	67	42	139	56	450	199	493	173	528	162	282	111	...	...	2,316	1,106	3,422			
			Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	
			Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
67. Diseases of the thymus.	(d) Tetany.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
69. Other general Diseases.	(2) Other diseases included under 69.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
IV. Diseases of the Blood and Blood-Forming Organs.																																		
70. Haemorrhagic conditions.	(a) Purpura.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
71. Anaemia, chlorosis.	(b) Haemophilia.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
71. Anaemia, chlorosis.	(a) Pernicious anaemia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Carried forward</i>			150	145	53	45	79	85	49	65	29	27	67	42	139	58	452	201	495	176	528	163	282	112	...	...	2,323	1,119	3,442					

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

IV. Diseases of the Blood and Blood-Forming Organs—(contd.)			Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
72. Leukaemia, aleukaemia.	(a) Other anæmias and ehlorosis.	Brought forward ..	150	145	53	45	79	85	49	65	29	27	67	42	139	58	452	201	495	176	528	163	282	112	...	...	2,323	1,119	3,442		
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(b) Other anæmias and ehlorosis.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		(1) Splenic anaemia.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays
76. Chronic poisoning by other organic substances.	(2) Other diseases of the spleen.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(b) Aleukaemia (Lymphadenoma).	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		(2) Other diseases included under 71b.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
V. Chronic Poisoning.	(a) Leukaemia.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(b) Aleukaemia (Lymphadenoma).	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		(2) Other diseases of the spleen.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carried forward ..	(a) Leukaemia.	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(b) Aleukaemia (Lymphadenoma).	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grand Totals	(a) Leukaemia.	Others	151	145	54	46	80	87	49	66	29	28	70	45	141	59	455	201	498	176	531	163	282	112	...	...	2,340	1,128	3,468		
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(b) Aleukaemia (Lymphadenoma).	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		(1) Splenic anaemia.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

VI. Diseases of the Nervous System and Sense Organs.		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
78. Encephalitis.	(a) Cerebral abscess.	Brought forward	151	145	54	43	80	87	49	66	29	28	70	45	141	59	455	201	498	176	531	163	232	112	...	...	2,340	1,128	3,468	
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	3	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
79. Meningitis.	(b) Other diseases included under 73.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
80. Tabes dorsalis (Locomotor ataxy).	(1) Progressive muscular atrophy.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
81 Other diseases of the spinal cord.	(3) Myelitis of unstated origin.	Chinese	2	2	3	6	2	4	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
82. Cerebral hæmorrhage, apoplexy, etc.	(a) Cerebral hæmorrhage.	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
82a. Cerebral hæmorrhage.	(1) Cerebral hæmorrhage so re-turned.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	2	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carried forward		155	150	58	52	83	94	51	66	29	28	73	45	144	62	459	203	513	180	540	167	299	118	2,404	1,165	3,569		

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MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

VII. Diseases of the Circulatory System.										Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals												
												M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F	M	F								
90. Pericarditis (heart).	Brought forward												313	272	240	201	149	153	55	69	30	28	72	46	146	63	462	207	514	191	549	169	315	123	...	...	2,846	1,522	4,368										
	Europeans																	
	Eurasians																	
	Chinese														
	Malays													
Indians													
Others												
91. Acute endocarditis (heart).	(1) Malignant endocarditis.														
	Europeans														
	Eurasians													
	Chinese												
	Malays												
Indians													
Others												
(2) Other acute endocarditis.	Europeans															
	Eurasians														
	Chinese												
	Malays												
	Indians												
92. Chronic endocarditis, Valvular disease (heart).	(1) Aortic valve disease.													
	Europeans														
	Eurasians													
	Chinese												1
	Malays											
Indians												
Others												
(2) Mitral valve disease.	Europeans															
	Eurasians														
	Chinese												
	Malays												
	Indians												
Others												
(3) Aortic and Mitral valve disease.	Europeans															
	Eurasians												...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

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MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

VII. Diseases of the Circulatory System—(contd.)		Nationality	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals		
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
96. Aneurysm.	(b) Other diseases included under 95.	Brought forward ..	314	272	240	292	149	155	55	70	31	28	75	50	151	68	486	218	553	216	597	193	370	152	...	...	3,021	1,624	4,645	
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(2) Heart disease (undefined).	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
97. Arterio-sclerosis.	(1) Arterio-sclerosis with cerebral hæmorrhage.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(2) Arterio-sclerosis with record of other cerebral vascular lesion.	Chinese
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
98. Gangrene.	(3) Arterio-sclerosis without record of cerebral vascular lesion.	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(a) Senile gangrene.	Eurasians
		Chinese
		Malays
		Indians
		Others
(b) Other gangrene.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese	...	...	...	...	...	...	2	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carried forward ..			314	272	240	203	149	157	56	73	31	28	76	50	152	69	493	220	573	221	623	195	414	168	3,121	1,656	4,777		

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MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

VIII. Diseases of the Respiratory System—(contd.)		Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals	
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
				453	378	524	455	383	344	88	122	43	45	89	62	169	79	555	246	634	242	692	222	478	196	...	...	4,118	2,390	6,508
112. Asthma.	(2) Other diseases included under 111.	<i>Brought forward</i>		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
113. Pulmonary emphysema.	(2) Other diseases included under 111.	Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
114. Other diseases of the respiratory system.	(a) Chronic interstitial pneumonia, including occupational diseases of the lung.	Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(b) Other diseases included under 114.	Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(b) Other diseases included under 114.	Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(1) Gangrene of the lung.	Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(2) Other diseases included under 114b.	Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Carried forward</i>				453	379	535	455	383	344	88	122	44	45	90	62	171	80	562	246	642	244	701	224	487	199	...	...	4,156	2,399	6,555

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

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IX. Diseases of the Digestive System—(contd.)										Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Unknown		TOTAL		Grand Totals	
										M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		M	F
119 & 120. Diarrhoea and enteritis.	(a) Diarrhoea and enteritis.	(1) Colitis.	Brought forward		..	466	384	549	467	384	348	89	123	45	45	91	62	173	82	569	248	659	250	714	225	494	201	...	...	4,233	2,434	6,667				
			Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese		1	2	13	7	12	10	1	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	2	1	...	...	32	20	...	...
			Malays		1	2	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	...	...	
	Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	
	Others		1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
	Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21. Appendicitis.	(b) Ulceration of the intestines.	(2) Other Diarrhoea and enteritis.	Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Indians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chinese		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malays		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22. Hernia, Intestinal obstruction.	(a) Hernia.	(1) Strangulated hernia.	Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Eurasians		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
			Chinese	
			Malays	
			Indians	
	Others		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Europeans		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

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IX. Diseases of the Digestive System—(contd.)		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals		
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
128. Diseases of the pancreas.	(2) Other diseases included under 127.	Brought forward ..		595	478	703	572	454	417	99	128	46	47	93	64	176	82	591	253	686	252	736	230	511	208	...	...	4,700	2,730	7,430	
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	1	...	...	...	...	...	...	...	3	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
129. Peritonitis without stated cause.		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	6	1	10	...	...	...	...	...	...	...	25	3	...	
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...
130. Acute nephritis.		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	1	...	1	...	3	2	1	2	5	...	1	...	2	2	4	1	3	7	1	...	...	...	...	...	...	25	16	...	
		Malays	...	...	...	...	...	1	...	1	...	...	...	...	...	...	1	1	...	2	...	...	...	...	...	...	1	9	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	2	1	...	...
131. Chronic nephritis.		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	1	...	...	...	...	...	5	1	7	12	15	19	41	...	...	...	...	...	3	3	...	...
		Malays	...	...	...	...	...	1	...	...	...	...	...	...	1	...	1	1	1	1	1	2	...	...	...	...	...	129	96	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	2	2	2	4	...	...	...	...	...	10	6	...	...
132. Nephritis not stated to be acute or chronic.		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	1	...	1	...	1	2	...	...	...	...	...	...	1	...	2	3	1	2	1	2	...	...	...	...	...	12	12	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	2	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	2	1	...	...
Carried forward ..		597	480	705	572	468	423	102	131	51	49	95	66	185	90	620	274	721	285	793	264	595	263	...	...	4,932	2,896	7,828			

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

X. Non-Veneral Diseases of the Genito-Urinary System and Annexa—(contd.)		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals																											
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F																												
133. Other diseases of the kidney and annexa.	(a) Pyelitis.	Brought forward																												597	480	705	572	468	423	102	131	51	49	95	66	185	90	620	274	721	285	793	264	595	263	4,932	2,896	7,828
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	1	2	...	1	...	...	...	...	...	...	...	...	2	...	5	...	...	1	...	...	...	...	...	...	...	...	...	...	...												
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
134. Calculi of the urinary passages.	(a) Calculi of kidney and ureter.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
135. Diseases of the bladder.	(a) Cystitis.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
136. Diseases of the urethra, urinary abscess, etc.	(a) Stricture of the urethra.	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
137. Diseases of the bladder.	(b) Other diseases of the bladder.	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
138. Diseases of the bladder.	(b) Other diseases of the bladder.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...</

X. Non-Venereal Diseases of the Genito-Urinary System and Annexa—(contd.)										Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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139. Diseases of the female genital organs.										Brought forward ..										597	480	706	574	468	424	102	131	51	49	95	67	186	93	623	280	722	287	797	265	600	265	4,947	2,914	7,861																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
										(b) Other diseases of the urethra, etc.										Europeans																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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										Indians									

XI. Diseases of Pregnancy, Childbirth and the Puerperal State—(contd.)		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
141. Abortion not returned as septic.	(1) Haemorrhage following abortion.	Brought forward ..	597	480	706	574	468	424	102	131	51	49	95	67	186	93	623	234	722	290	798	266	600	265	...	...	4,948	2,922	7,870	
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
142. Ectopic gestation.	(2) Without record of haemorrhage.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
143. Other accidents of pregnancy.		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
144. Puerperal haemorrhage.	(a) Placenta praevia.	Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
145. Puerperal sepsis.	(b) Other puerperal haemorrhage.	Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
145. Puerperal sepsis.	(a) Puerperal Septicæmia and pyæmia.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
145. Puerperal sepsis.	(b) Puerperal tetanus.	Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
146. Puerperal albuminuria and convulsions.	(1) Puerperal convulsions.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
146. Puerperal albuminuria and convulsions.		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Carried forward ..			597	480	706	574	468	424	102	131	51	49	95	69	186	113	623	311	722	308	798	268	600	265	...	...	4,948	2,992	7,940	

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR 1932.

XI. Diseases of Pregnancy, Childbirth and the Puerperal State—(contd.)										Nationality.		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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147. Other toxæmias of pregnancy.	<i>Brought forward</i>										597	480	706	574	468	424	102	131	51	49	95	69	186	113	623	311	722	308	798	268	600	265	4,948	2,992	7,940																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
148. Puerperal phlegmasia alba dolens, embolism and sudden death.	(a) Puerperal phlegmasia alba dolens not returned as septic.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
149. Other accidents of childbirth.	(b) Puerperal embolism and sudden death.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
150. Other or unspecified conditions of the puerperal state.	(3) Childbirth (unqualified).																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
XII. Diseases of the Skin and Cellular Tissue.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

XII. Diseases of the Skin and Cellular Tissue—(contd.)		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals		
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
153. Other diseases of the skin and its annexa.	(2) Acute abscess.	Brought forward ..	598	483	707	578	472	425	102	131	51	49	95	72	188	117	624	320	723	311	803	270	600	266	...	...	4,963	3,022	7,985		
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	2	...	...	2	1	3	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	4	5	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
XIII. Diseases of the Bones and Organs of Locomotion.																															
154. Acute infective osteomyelitis and periostitis.		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
155. Other diseases of the bones.		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
156. Diseases of the joints and other organs of locomotion.	(b) Diseases of other organs of locomotion.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
157. Congenital malformation.	(a) Congenital hydrocephalus.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Carried forward ..	602	483	708	581	476	429	102	131	51	49	96	72	188	117	625	320	725	311	804	271	600	267	...	...	4,977	3,031	8,008		

XIV. Congenital Malformations.

XIV. Congenital Malformations—(contd.)

[illegible]

XV. Diseases of Early Infancy.

[illegible]

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

[illegible]

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

[illegible]

MORTALITY ACCORDING TO DISEASE, NATIONALITY, AGE AND SEX FOR THE YEAR, 1933.

[illegible]

XVII. Deaths from Violence.—(contd.)		Nationality.	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		TOTAL		Grand Totals
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
187. Cataclysm.		Brought forward ..	897	745	726	597	487	430	107	138	59	49	103	76	201	122	666	334	757	320	830	277	821	508	...	...	5,654	3,596	9,250
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	2	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
188. Injury by animals (poisoning by Venomous animals excepted).		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...
194. Other and un-stated forms of accidental violence.	(2) Other causes included under 194.	Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
195. Violent deaths of unstated nature (i.e., accidental, suicidal, etc.)		Chinese	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
198. Execution.		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
XVIII. Ill-Defined Diseases.																													
200. Cause of death unstated or ill-defined	(1) Heart failure.	Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(2) Other ill-defined causes.	Others	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Malays	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	(3) Causes not specified.	Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Others	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Europeans	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Eurasians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Chinese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL		901	749	730	600	492	432	110	140	59	52	104	77	208	123	683	339	777	325	852	289	825	516	3	1	5,744	3,643	9,387	

The following return shows the total number of deaths at different age periods in the different nationalities:—

Mortality According to Nationalities and Ages Period for the Year 1933.

Nationality	Sex	Under 3 months	3—12 months	1—5 years	5—10 years	10—20 years	20—25 years	25—35 years	35—45 years	45—55 years	Over 55 years	Unknown	TOTAL
Europeans	M	3	1	—	1	1	1	3	6	5	7	—	28 } 41
	F	2	—	—	—	—	—	4	2	—	5	—	
Eurasians	M	5	4	7	1	3	1	4	4	6	12	—	47 } 93
	F	5	4	4	—	1	3	3	4	6	16	—	
Chinese	M	725	548	409	94	122	138	518	644	731	647	1	4,577 } 7,397
	F	618	479	355	115	90	90	239	256	218	360	—	
Malays	M	119	133	46	7	21	23	70	49	44	84	—	596 } 1,059
	F	80	83	40	14	19	15	47	37	37	91	—	
Indians	M	44	40	26	7	13	39	80	66	58	59	—	432 } 680
	F	36	30	28	7	17	14	39	24	19	34	—	
Others	M	5	4	4	—	3	6	8	8	8	16	2	64 } 117
	F	8	4	5	4	2	1	7	2	9	10	1	
Total	M	901	730	492	110	163	208	683	777	852	825	3	5,744 } 9,387
	F	749	600	432	140	129	123	339	325	289	516	1	
Grand Total	..	1,650	1,330	924	250	292	331	1,022	1,102	1,141	1,341	4	9,387

GENERAL DEATH RATE.

The crude death rate was 19.66 per 1,000 living compared with 20.12 in 1932 and 25.20 in 1931. This again constitutes a new low record for the city.

I discussed fully in my 1932 report, and have already referred to the subject in this one, the possible criticism of the low death rate that it might be calculated on too high an estimate of population. But, as I have already said, there has been little sign of any marked exodus from the town since the 1931 census, so that the statistics of at least the past three years are strictly comparable.

I am more than ever convinced that for the moment the figure now obtaining, in the absence of big epidemics of dangerous infectious disease, must be somewhere near the standard death rate that Singapore can expect. Nothing like the same rapid improvement that has taken place in the last two decades can be hoped for in future. There can and should be improvement, of course, but it must be slow as it depends on the eradication of evils which, though not peculiar to tropical cities, are not looked on here with the same disfavour as they are in countries where the main mass of the population is educated up to and in sympathy with all measures designed to protect the public health. Two such evils come

to my mind at once—the squalid living conditions obtaining in our overcrowded slums, and the loose way in which food generally, but especially cooked food, is allowed to be prepared, handled and distributed by hawkers. It is no exaggeration to say that if these two evils could be eradicated we might reasonably expect another 5% decline in the death rate.

The main causes of death are shown in the following table, the 1932 figures being given for comparison:—

			1933	1932
Pneumonias and Bronchitis	...	...	1,644	1,539
Tuberculosis	...	...	1,189	1,088
Infantile Convulsions	...	...	733	786
Diarrhoea and Enteritis	...	...	656	684
Diseases of Early Infancy	..	...	584	603
Beri-beri	...	...	434	509
Malaria	...	...	366	463
Dysenteries	...	..	325	382
Total			5,931	6,054

The sum totals of these are much the same as last year. In both cases they account for about 63% of all deaths. But there are rather definite differences within the groups. Where last year the Pneumonias and Tuberculosis taken together, accounted for 24.4% of all deaths, this year they account for 26.6%

It should be noted that in the above calculation I have not included the deaths from Bronchitis. As most of these occurred in children under 5 years the likelihood is that many of them were really cases of Broncho Pneumonia, and if so, might equally with Tuberculosis and the Pneumonias proper, be debited to the account of our congested areas. Anyhow the increase of over 2% is rather disquieting and at first sight is somewhat of a reflection on the rate at which we are improving the slums. But it is only fair to record that the rough censuses of the congested blocks already referred to, prove that these areas are more overcrowded than ever before due to the need for the tenants to spread the burden of the heavy rents over as many cubicle dwellers as possible.

I should explain that for the purpose of my Annual reports and as a guide to what our slums are responsible for, I have always grouped Tuberculosis and the Pneumonias together. Due to the faulty methods of diagnosis and registration, there may be many errors in each group but the two taken together may be regarded as reasonably accurate.

The other main causes of death call for little comment at this point.

Possibly the 434 cases of Beri-beri cover a multitude of mal-diagnoses but there was undoubtedly a good deal of destitution during the year so that many of the deaths in this group were most likely due to diet deficiency of some kind.

The 366 malarial deaths show a big decline on the 1932 figures. And even so it is unlikely many of them belong to Singapore town. As in previous years, we analysed the notification of the disease received from Government hospitals according to the home addresses of the patients and our more or less exact knowledge of the “Anopheline” state in the vicinity of those addresses. At the very most not more than 30% could have contracted the disease within municipal limits and other evidence would

show that the figure is likely to be much less. At the Health Office dispensary, for instance, where most of the 850 members of the clerical and subordinate staff, and all the 7,900 members of the labour force are treated, there were only 56 primary attacks of malaria recorded during the year.

I am very doubtful if the 325 deaths from Dysentery are correctly labelled. At any rate half of them were so certified by the Inspecting Registrars on a view only. It is possible that many of them might have been Typhoid deaths. The point is not really important however. What is important is that conditions in Singapore become less and less favourable to the spread of Dysentery epidemics and all or most of these cases, whether Dysentery or Typhoid, are spread by "carriers" through the medium of food. So that the remarks made anent food hawkers when discussing Typhoid equally apply here.

INFANTILE DEATH RATE.

This was 176.5 per 1,000 live births and, like the crude death rate, is also a new low record for the city. The rates in 1932 and 1931 were 180.2 and 204.3 respectively.

The total number of deaths of infants was 2,980 in 16,881 live births—the corresponding figures for 1932 being 2,994 in 16,589 live births. The chief causes of death are tabulated below, the 1932 figures being given for comparison.

	1933	1932
Bronchitis and Pneumonia ...	783	674
Infantile Convulsions ...	610	655
Diseases of Early Infancy ...	578	603
Diarrhoea and Enteritis ..	471	469
Tetanus	186	95
Syphilis	104	118
Total	2,732	2,614

Where the causes of death are so vague and cover so wide a field of possibilities as in several of the above it is very difficult and even dangerous to draw more than very general conclusions. There are good reasons, as I shall endeavour to show later, why many of the deaths shown under some of these headings might well be referred to a more specific cause.

The increase in deaths from Bronchitis and Pneumonia is disappointing. There is no reason to think that they are not on the whole reasonably accurate. They must be due to the undoubtedly increased local overcrowding in the congested areas and a lowered standard of hygienic surroundings.

Regarding Tetanus as a cause of death we see that the figures are more than double those of 1932. I do not think, however, this indicates a real increase. Rather does it mean a more exact diagnosis. During the year the Coronor insisted on a post mortem in all cases of infants dying in hospitals and of the 186 certified as dying of Tetanus he himself so certified 80. Fears have since been expressed by him that, because he found this large number, there must have been many more undiscovered, but I am confident his fears are groundless for the following reason. Of the 69 cases in his series which came from the Municipal area, 42 were sent to hospital by the Infant Welfare department with, in many of them,

a provisional diagnosis of Tetanus already made. As 84% of all the infants born in the city are seen by the Infant Welfare staff twice within ten days of birth, it is obvious that not many query tetanus cases could be missed. The only ones that can be missed are those where no doctor or midwife was in attendance at birth and in consequence registration is either neglected or very late. And even these we come across sooner or later. In proof of this too is the fact that the Coroner reported in connection with his series of cases that most of the mothers were self-attended at birth, and in no case was a registered midwife involved.

The figure 104 for Syphilis is to my mind hopelessly understated. I am confident, reasonably certain in fact, that many of the deaths registered under, especially Convulsions and Diseases of Early Infancy, and to a lesser degree Diarrhoea and Enteritis, would with more exact knowledge appear under Congenital Syphilis. The loose term Convulsions must cover many possibilities, and of the 578 deaths under diseases of Early Infancy, 307 were labelled Premature Births, and 181 as Congenital Debility—both very vague terms indeed.

In this connection I should record that of the 2,980 deaths of infants, 894 were certified after a view only, by the Inspecting Registrars attached to the department. Amongst others they returned 368 deaths from Convulsions, 111 from Congenital Debility, 87 from Premature Birth and 99 from Diarrhoea and Enteritis. But of deaths from Syphilis they reported only 11. At the same time they returned 132 Still births. But in the course of the Special investigation, to be mentioned later, the blood of the mothers of 80 of these still born babies was examined and 27.5% showed a positive Wassermann. And over a series of 489 mothers of infants dying from all causes, in the Registrar's series, 15.6% gave a positive Wassermann. It is not unlikely, therefore, that quite a large proportion of the deaths from Convulsions and diseases of Early Infancy were really due to Syphilis.

The Special investigation in question was fully described in my 1932 Report. Briefly it consists of two parallel investigations, an examination of the Wassermann state of the mothers of dead infants certified by Inspecting Registrars, and a similar examination of the mothers of live babies, taken on our Infant Welfare Clinic registers, who, for no obvious reason are not thriving as they should. It has now been carried out for two years and will be continued for some little time longer.

During the year 487 mothers were so examined in the Registrar's series with, as already stated, 15.6% positive.

The cases were distributed according to the age of the child:—

	Stillbirths	1 hour to 3 months	3 months to 6 months	6 months to 9 months	9 months to 12 months
Positive	22	31	14	4	5
Negative	58	202	65	39	47
% age positive	27.5	13.3	17.7	9.3	9.6

And according to the nationality of the mothers:

	Eurasians	Chinese	Malays	Indians	Others
Positive	—	42	22	10	2
Negative	2	287	89	31	2
% age positive	—	12.76	19.89	24.39	50

From the time the investigation was commenced up to the end of the year 934 mothers had been examined and 18.5% found to be Wassermann positive.

In the Infant Welfare series 927 mothers of ailing children were serologically tested and 18.12% were Wassermann positive. And since the investigation began to the end of the year 1857 mothers had been examined and 23.64% found to be positive.

Further more detailed analyses of these serological tests and others made in connection with them will be found in the reports of the Infant Welfare department, and the Bacteriological laboratory.

The investigation is being carried on and will, I hope, be continued for some years still but I think it is already abundantly clear that a large percentage of the deaths returned as due to the indefinite causes which I have mentioned should more properly be transferred to Congenital Syphilis.

The Infantile death rate for the decade 1913-1922 was 267.9, for the decade 1923-1932 it was 212.2 and for the year under review as seen, it was 176.5. Improved midwifery methods and training of midwives were introduced a little prior to 1913 and Infant Welfare work, from small beginnings in the end of the first decade, was gradually intensified during the second decade. I have little doubt but that the great saving of infant life shown by these figures can be directly attributed to these two main factors. There are still, of course, many unnecessary and avoidable deaths caused by the ignorance of Asiatic mothers and I have no doubt that in time, as the members of the Infant Welfare staff become more expert, many of these will be prevented. But, as with the crude death rate, I feel that the time has now come to strike a note of warning and must ask the Commissioners not to look in future for the spectacular reductions that the past two decades have seen, as it must be perfectly obvious that until the scope of the Infant Welfare department is greatly and radically extended we must continue to have a large number of deaths on which the activities of that department, as at present constituted, cannot have even the remotest effect.

The creation of an ante natal centre for the treatment of the infected expectant mother is overdue.

CERTIFICATION OF DEATHS.

The following return shows the number of deaths, the causes of which were certified by Medicalmen, Inspecting Registrars and the Coroner respectively:—

	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
Medicalmen ..	32	77	5,109	328	415	93	6,054
Registrars ..	2	10	1,792	707	200	14	2,725
Coroner ..	4	5	504	26	62	7	608
Total ..	38	92	7,405	1,061	677	114	9,387

This gives a percentage of 64.5 certified by Medicalmen as against 63.5 last year, 29.0 by Registrars as against 29.6 last year and 6.5 certified by the Coroner as against 6.8 last year.

The percentages for the last 10 years have been as follows:—

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Medicalmen .	58.5	58.7	59.6	63.6	65.1	66.0	68.2	63.6	63.5	64.5
Registrars ..	35.0	33.9	34.1	30.1	28.9	29.1	28.4	31.6	29.6	29.0
Coroner ..	6.3	7.2	6.2	6.2	5.9	4.8	3.3	4.8	6.8	6.5

There were 16,881 births and 9,387 deaths registered at the Central office. 65 births and no deaths were entered in the post registration book and the sum of \$218 was received in late registration fees.

Dr. Lee Lian Hoe again carried out the investigations of the Wassermann state of the mothers of children whose deaths were certified by his department and I have again to record my appreciation of the tactful manner in which he did so.

VI & VII ANALYTICAL AND BACTERIOLOGICAL LABORATORIES.

Both reports are appended. They are valuable records of useful work—both routine and research. References will be found to them throughout my report but they must be read in their entirety to gain any impression of the very important part these laboratories play in the activities of the whole Health Office, and of the assistance they are, not only to myself, but to other heads of departments.

VIII. ANTI-MOSQUITO WORK.

Complete details will be found in Dr. Dawson's report which is appended.

New works. New work was carried out in five areas involving the cutting of 2,510 yards of main earth ditches and the laying of 2,201 yards

of concrete channels. In existing areas 2,201 yards of concrete channels, replacing a similar length of earth ditches, were constructed and 1,545 yards of subsoil pipes were put down.

During the year 7 gangs of 20 men were constantly employed on maintenance in existing areas, 2 gangs on new works, and 2 gangs on Patrol work in the Katong and Siglap areas.

6 Field Workers were continuously engaged in routine mosquito surveys till July when the services of 3 were dispensed with. They brought 3,089 collections of larvae to the laboratory for identification.

11,868 gallons of anti-malarial mixture were used during the year mainly in the A. Ludlowi (Sundaicus) breeding grounds of the Kallang and Geylang River basins.

The total amount spent on all anti-mosquito work during the year was \$52,018 as compared with \$88,276 in 1932.

It may be of interest to record that at the end of the year there were under permanent maintenance 132 separate anti-mosquito areas. In these there are 130,861 yards of subsoil pipes, 73,955 yards of concrete channels and 33,142 yards of earth drains.

IX. SUPERVISION OF MIDWIVES & INFANT WELFARE.

The report of the Lady Medical Officer is appended.

The District Sisters paid a total of 19,398 visits. These, of course, are more particularly concerned with the supervision of midwives and the care of sick mothers, than with Infant Welfare.

Of the 14,666 mothers visited, 10,089 were found to be living in single rooms or cubicles.

3,873 mothers had no skilled attention at birth. This large number is disappointing as, though it is no doubt due to poverty, it is to a certain extent unnecessary as there is attached to each of the two large Clinics a Municipal midwife whose services may be booked free of charge. An effort must be made to advertise this fact rather more freely. As it was they were called to attend 579 cases as against 250 for last year. They were also sent to give post natal assistance to a further 308 cases and altogether paid a total of 3,649 visits.

Doctors on the Panel attended 28 cases, the fee being paid by the department.

14,190 new babies were entered in the Clinic registers. This represents 84% of all births. The figure in 1932 was 87%.

In the Clinics 49,237 consultations were held while on the districts the visitors paid 106,817 visits in the houses.

During the year there was some difficulty experienced in maintaining the standard we have set of paying 10 visits to each infant in its first year of life, so much so that I am just beginning to wonder whether we are not in danger of "rushing" these visits. To be successful in our aim it is essential that the Visitors should have plenty of time to sit down in the homes and gain the confidence of the mothers. They must encourage the mothers to consult them not only about the particular baby which is

the object of their visit, but about all the difficulties of motherhood generally. Under no circumstances must the Visitor's work be such as to encourage them to become slaves of routine.

It is difficult to strike the happy medium, but the position is being closely watched. If it should be found impossible to increase the staff it may be advisable to reduce the number of visits or to cut out altogether outlying districts where much time is spent over comparatively few babies.

As I have said earlier in my report an extension of our ante natal activities, where scientific treatment can be given to expectant mothers, is overdue. I reiterate my belief that, at the moment at any rate, no institution or hospital is so suitable or so "sympathetically" staffed for this purpose as the Infant Welfare department.

X. FOOD AND MARKETS.

The report of the Chief Market Inspector is appended.

Wet fish sales fell quite markedly during the year so that the revenues from the 5% commission dropped by nearly \$16,000. Stallholders, too, seemed to have a trying time and market revenues all over dropped by nearly \$35,000. This fall has been progressive in recent years and since 1929 there has been a decrease of nearly \$140,000.

23,441 catties of unsound foodstuffs were seized or surrendered in the Markets and 44,784 catties in shops in the town. It was all conveyed to the Incinerator and destroyed.

FOOD SHOPS ETC.

Licences were issued for:—

Eating Houses	...	...	806
Coffee Shops	...	...	278
Soda Fountains	...	...	50
Meat and Fish Shops	...	..	145
Bakeries	...	..	22
Cake Shops	...	...	34
Biscuit Factories	...	...	4
Aerated Water Factories	...	...	9
Milk Vendors	...	...	154

XI. PLACES OF PUBLIC RESORT.

Theatres, Hotels, Public Houses, Printing Presses etc. were regularly inspected at the request of the licensing authorities concerned, and the necessary reports were made.

XII. SLAUGHTER HOUSES.

During the year 259,506 animals were slaughtered in the Municipal Abattoirs. They were as follows:—the 1932 figures being given for comparison:—

		1933	1932
Pigs	...	210,249	221,353
Sheep	...	32,927	42,297
Goats	...	2,131	1,465
Oxen	...	13,975	12,958
Buffaloes	...	224	235
Total	...	259,506	278,308

1,182 carcasses were totally condemned, 794 of them being pigs, 357 sheep, 23 oxen, 5 goats and 3 buffaloes. Of the pigs, 486 were suffering from *Cysticercus Cellulosae*, 186 from Swine Fever, and 24 from Tuberculosis. 13 of the oxen also showed generalised Tuberculosis.

The jetty in the Rochore Canal adjoining the Pig Storage depot was opened in August and up to the end of the year 2,975 imported pigs were landed there and admitted either to the depot or direct to the Abattoir.

During the year the remaining slaughter halls at the French Road Pig Abattoir were fitted with the "Electrolethaler." It has proved an unqualified success, and all pigs are now "stunned" by this apparatus prior to slaughter.

Towards the end of the year, too, a 'Weinberg' casting pen was set up in the Cattle Abattoir. It was perhaps not quite an unqualified success but several adjustments will have to be made before it can be thoroughly tried out.

XIII. OFFENSIVE TRADES.

445 licences, 373 of them being for laundries, were issued during the year, the fees drawn being \$2,130.78.

Nothing was done during the year with regard to the compulsory Pasteurisation of fresh milk. As I stated last year the duty of establishing pasteurisation centres must fall on the Commissioners. And at the moment the financial position does not permit of it.

XIV. BURIAL GROUNDS.

The number of burials in Municipal Cemeteries was as follows:—

Bidadari—			1933	Since Opening
Protestant	...	..	139	3,303
French Roman Catholic	...	...	180	3,813
Portuguese Roman Catholic	...	...	48	1,335
Pauper	...	...	592	12,903
Serangoon Road—				
Mohammedan	...	..	1,169	10,997
Pauper	..	...	101	1,094
Bukit Brown—				
Chinese	..	...	446	6,292
Pauper	...	...	2,269	13,067
Hindoo Cemetery—				
Burials	...	...	266	2,491
Cremations	...	...	104	849
Paupers	..	...	97	607
Singhalese Burial Ground—				
Burials	...	...	5	13
Cremations	..	...	1	3
Paupers	...	..	2	3
Infectious Disease—				
Serangoon Road	...	...	57	768
Yeo Chu Kang Road	...	...	—	555
Total			5,476	58,093

The Burial Grounds Inspector made 2,004 inspections during the year and attended 31 exhumations.

The total number of burials inside Municipal limits was 7,180. Of these, 5,476 were, as seen, in the Municipal cemeteries, the remainder being in the 19 private and 92 public cemeteries. Most of the non-Municipal Cemeteries are for Chinese.

XV. STAFF.

The writer went on five months' leave early in May, returning in October. Dr. Dawson was in charge during this period.

Dr. Elsie Crowe resigned at the end of her agreement in November. Dr. Muriel Clark succeeded her and assumed duty in October.

Probationary Inspectors Marcus, Bennett and Nicholas after being seconded for six months to attend the local school at Jalan Klapa were all successful in obtaining the diploma of the Royal Sanitary Institute, taking first, second and eighth places respectively.

HEALTH OF MUNICIPAL SUBORDINATE STAFF.

The number of cases treated was 10,185. There were 674 sent to hospital and 224 to various Clinics. 14,433 days' sick leave were granted, 13,132 dressings were applied at the office dispensary where the daily attendances totalled 26,599. Private Practitioners treated 329 cases while the Medical Officer in charge paid 264 visits to patients in their homes.

XVI. GENERAL.

There were 3,357 notices including 567 intimations served during the year which, with 237 from the previous year, made a total of 3,594. Of these, 3,223 were complied with, 166 cancelled and 205 carried forward.

There were 43,427 visits of inspection paid by the Sanitary Inspectors, 1,681 prosecutions with 1,457 convictions with fines imposed amounting to \$7,427.50 while 75 prosecutions were withdrawn and 149 summonses could not be served.

The following reports and returns are appended:—

- Anti-Mosquito Report.
- Report of the Analyst.
- Report of the Bacteriologist.
- Report of the Lady Medical Officer.
- Report of the Superintendent Middleton Hospital.
- Report of the Market Inspector.
- Return of Inspectors' prosecutions.
- Return of Notices.
- Return of licences for Offensive Trades.

It gives me great pleasure to conclude by recording my very grateful appreciation of the loyal service and assistance which I had, during the year, from all members of the staff, both senior and subordinate.

I have the honour to be,

Sir,

Your obedient servant.

P. S. HUNTER,

M.A., M.B., CH.B., D.P.H.,

Municipal Health Officer.

MUNICIPAL HEALTH OFFICE,

SINGAPORE, 23rd February, 1934.

THE MUNICIPAL HEALTH OFFICER,

SINGAPORE.

SIR,

I have the honour to forward the following report on anti-mosquito measures carried out in the Municipal Area during the year 1933.

ANTI-MALARIAL WORKS.

New works were carried out in the following areas:—

Area No 132 Bugis Estate. This area is situated near the junction of Dunearn Road and Kheam Hock Road and consists of two ravines in which *A. maculatus* had been frequently found to be breeding in seepages..

In Ravine No. 1 the level of the subsoil water had been artificially raised by the construction of a bund across the ravine and the formation of a large pond. The water in the pond was released by cutting a breach in the bund and laying a three-foot Hume pipe culvert for a distance of 50 feet under the bund. A deep earth ditch was then cut from Dunearn Road to the head of the ravine, a distance of 529 yards.

Ravine No. 2 follows the line of Kheam Hock Road for a distance of 200 yards and then swings off into the Bugis Estate. A deep earth ditch was cut through the centre of the ravine for a distance of 626 yards..

290 trees were felled and removed from the two ravines.

Area No. 130 Mount Washington Ravine. The work of clearing and ditching this ravine was continued and completed. The length of the main earth drain cut in this area is 1358 yards.

Area No. 118 Island Golf Club. This area is situated within Municipal Limits at the 6 $\frac{3}{4}$ milestone Thomson Road, and there were many breeding places of *A. maculatus* in seepages in the ravine which traverses the area and eventually joins the overflow spillway from Pierce Reservoir.

An existing main earth drain in the ravine was deepened and regraded for a distance of 780 yards and a small subsidiary ravine, 183 yards in length was treated in a similar manner. Permanent springs in the ravine were put underground by laying subsoil pipes discharging into the main earth channels and a concrete anti-malarial drain with slab revetment was laid for a short distance in the upper part of the main ravine to prevent scour. In all, 400 feet of twenty-one inch concrete channels 40 feet of eighteen-inch concrete channels and 422 eighteen-inch concrete revetment slabs were laid.

276 feet of eight-inch subsoil pipes, 1253 feet of five-inch subsoil pipes and 1641 feet of four-inch subsoil pipes were laid for the drainage of seepages.

EXTENSIONS OF EXISTING WORKS.

Permanent drainage and extension of existing works was carried out in the following areas:—

Area No. 117 Telok Blangah Road Ravine. The earth drain in this area was replaced by a concrete anti-malarial channel and permanent springs were dealt with by means of subsoil pipes. A series of six concrete steps and a concrete spillway were constructed over a ridge of outcropping granite blocking the ravine.

788 feet of twenty-one inch concrete channels 32 feet of fifteen-inch concrete channels 796 feet of twelve-inch concrete channels 3264 eighteen-inch concrete revetment slabs and 20 fifteen-inch concrete revetment slabs were laid.

198 feet of five-inch subsoil pipes and 3,834 feet of four-inch subsoil pipes were laid for the drainage of seepages.

Area No. 115 Alexandra Road Ravine No. 2. This ravine, the waters of which constitute one of the branches of the Sungei Berlayer, is the only one on the South side of the Mount Faber ridge which is not permanently drained. The gradients in the ravine are steep and much damage to temporary earth drains from scour has occurred from time to time. The construction of permanent anti-malarial drains was commenced during the year. In the short subsidiary ravines which rise at a very steep gradient from the main ravine, concrete steps were constructed to break the force of falling water and in one ravine a Hume pipe culvert 29 feet in length and 18 inches in diameter was constructed under a reserve road.

1035 feet of twenty-one inch concrete channels, 345 feet of eighteen-inch channels, 125 feet of fifteen-inch channels, 253 feet of twelve-inch channels, 3987 eighteen-inch concrete revetment slabs, 154 feet of five-inch subsoil pipes and 451 feet of four-inch subsoil pipes were laid.

Work is in progress.

Area No. 38 Alexandra Swamp. A short subsidiary ravine in this area was cleared of undergrowth, and drained by cutting 75 yards of earth drain. Five ponds were drained and the floor of the ravine was levelled off.

Area No. 110 McRitchie Reservoir Ravine. Dangerous seepages in this area were dealt with by laying 1,000 four-inch subsoil pipes and 305 five-inch subsoil pipes and similar seepages were dealt with in the following areas:—

Area No. 66 Tanglin Road Ravine. 60 four-inch subsoil pipes laid.

Area No. 107 Wayang Satu. 133 eight-inch and 56 four-inch subsoil pipes laid.

Area No. 83 Swiss Cottage. 162 four-inch subsoil pipes laid.

Area No. 26 Mosque Ravine. 65 feet of five-inch subsoil pipes laid.

Area No. 19 Singapore Harbour Board Ravine. 140 five-inch and 70 four-inch subsoil pipes laid.

Area No. 100 Adam Park. 110 four-inch subsoil pipes laid.

Area No. 4 Claymore. 250 five-inch subsoil pipes laid.

Many smaller repairs and extensions were carried out in other areas.

MAINTENANCE.

Routine maintenance work consisting of clearing and grass cutting was carried out in all the existing anti-malarial areas.

MOSQUITO SURVEYS.

Systematic surveys of the Municipal Area were regularly carried out and 3,089 collections of mosquito larvae were examined and identified in the laboratory.

GENERAL ANTI-MOSQUITO WORK.

763,372 yards of earth drains were cleared and regraded by patrol gangs and these gangs collected and disposed of a monthly average of 939 large baskets of empty tins. Numerous small ponds and wells were also filled.

OILING.

11,868 gallons of anti-malarial mixture were used in spraying mosquito breeding places principally in the Kallang and Geylang River basins.

CONTROL OF DOMESTIC MOSQUITO BREEDING.

Mosquito larvae were found in 6,085 houses and compounds or 14% of the houses visited by the Sanitary Inspectors.

219 complaints of nuisance from mosquitoes were investigated and in 90 cases the nuisance was found to be principally due to mosquitos found breeding on the complainant's premises.

83 notices were served under the Destruction of Mosquitos Ordinance during the year.

I have the honour to be,

Sir,

Your obedient servant,

W. DAWSON,

Deputy Health Officer.

CHEMICAL LABORATORY,

SINGAPORE, 27th January, 1934.

THE MUNICIPAL HEALTH OFFICER,
SINGAPORE.

SIR,

I have the honour to report on the work done in this department during the year 1933.

The total number of samples analysed during the year was 14,431, the detailed figures of which are as follows:—

Public Water Supply	{	Routine samples from Singapore	
		Island	6,643
		Routine samples from Johore ..	1,871
Sewage Purification	{	Samples from Sewage Purification	
		Works and special samples ..	2,867
		Samples from House Installations ..	477
Foods, Drugs and Miscellaneous Samples	{	From Health Department ..	1,058
		From Engineering Department ..	413
		From Electrical Department ..	496
		From Water Department ..	292
		From Gas Department ..	303
		From Other Departments ..	11

A comparison of these figures with those given in my last report shows that practically every department is taking more advantage of the facilities available in this laboratory for chemical routine and research analyses.

In addition, there is a good deal of unofficial consultative work with other departments.

MUNICIPAL WATER SUPPLY.

The main sources of supply of raw water were from Peirce reservoir on Singapore Island and Sultan Ibrahim reservoir in Johore. The waters from MacRitchie reservoir (Singapore Island) and Pontian reservoir (Johore) were being drawn on during the first five months only of the year.

The chemical characteristics of these sources of supply are practically the same as found for the previous year. They are all very "soft" waters containing traces only of iron compounds and are always found to be free from any harmful contamination.

The averages and ranges of analyses of these various waters are shown in detail in Table A, at the end of this report.

The method of chemical treatment depends on the type of sand filters used. In Johore the use of rapid sand filters necessitates efficient coagulation of all suspended and colloidal matter before filtration. This is achieved by adding the requisite quantity of aluminium sulphate solution to the raw water and the coagulated solids are allowed to settle out as much as possible before passing to the filter beds, by passing the treated water through large settling tanks.

After filtration the water receives a small dose of lime to make up for the alkalinity lost during the aluminium sulphate treatment and finally the purified water is chlorinated. The average quantities of these chemicals added per thousand gallons of water were only one ounce of aluminium sulphate, three quarters of an ounce of lime and one-thirtieth of an ounce of chlorine. These figures apply to the raw water from Sultan Ibrahim reservoir which supplied water to the filters throughout the year.

In Singapore the use of slow sand filters obviates the necessity for the efficient coagulation of solid matter before filtration and the raw water from the Island reservoir is merely "limed" before filtration, using an average of one half of an ounce of lime per thousand gallons of water. After filtration chlorine is added to the extent of one-twelfth of an ounce per thousand gallons.

These methods have been found to give excellent results, the public water supply being of excellent appearance and suitable in every way for drinking and all ordinary domestic uses. I have found, however, that it is essential that the quantity of alum added to the Johore raw water should be tested and, if necessary, altered daily, to make certain that the requisite quantity is being added to give complete flocculation of solid matter. The test, which is a very simple one, is now being carried out daily at the Pulai filter house and the filtered water has since shown a remarkable improvement and is now of excellent appearance and quality.

The averages and ranges of analyses of the public water supply, taken from Havelock Road and Coleman Street, are shown in detail in Table B, at the end of this report.

SEWAGES. EFFLUENTS ETC. FROM THE MUNICIPAL SEWAGE WORKS.

These works at Alexandra Road treated an average daily volume of 4,013,000 gallons of sewage, which is an increase of four per cent on the flow for 1932 and sixteen per cent on the flow for 1931.

The sewage passes through grit, or Detritus, tanks and sedimentation tanks to separate the solid matter as far as possible from the sewage. This solid matter accumulates at the bottom of the sedimentation tanks and is pumped off into other tanks where it undergoes fermentative and other changes to yield finally an innocuous solid matter. The remaining sewage, freed from much of its solid matter, is run through large filter beds made of screened coral where oxidation occurs to give a clear and innocuous liquid. This liquid, after passing through further sedimentation tanks (Humus tanks) to allow any further organic matter to deposit, is run into the stream at Alexandra Road. The quality of this effluent is excellent, being well above the quality stipulated for similar sewage effluents in England.

The character of the crude sewage treated at Alexandra Road is almost identical with that treated during the previous year. The following table shows how the strength of the sewage has varied during the last five years.

AVERAGE ANALYSES OF CRUDE SEWAGE TREATED AT ALEXANDRA ROAD WORKS DURING THE YEARS 1929—1933.

Year	Free Ammonia	Albuminoid Ammonia	Oxygen Absorbed in 4 hours	Suspended Matter	Chlorides as Chlorine
1929	3.6	0.7	6.18	36.4	86
1930	3.9	0.9	9.95	34.4	82
1931	4.0	1.0	10.27	34.4	55
1932	4.4	1.2	11.78	40.2	48
1933	4.5	1.2	11.31	38.7	29

The increases in the ammonia and oxygen absorbed figures are obviously due to the continual increase in the amount of night soil dumped into the water-borne sewage. Unfortunately this strong night soil makes a very heavy load on the working of the tanks and filter beds as it is all received between about 9 a.m. and 5 p.m. daily. There is a very encouraging decrease in the salinity of the sewage, as shown by the chloride figures, showing that the repairs to the sewers have resulted in much less sea water infiltration.

The Detritus tank retained an average of 9.05 per cent of the suspended matter in the crude sewage, the monthly averages varying between 4.9 per cent and 14.25 per cent. These solids, after drying completely were found to contain 42.4 per cent. of mineral matter (sand etc.) which is a fairly normal value for this tank.

The Sedimentation tanks have been added to during the year by the construction of one large square tank of improved design known as a Dorr tank (with a patent clarifier for assisting settlement of solid matter with periodical removal). This tank, which has a capacity equal to that of twenty four of the Imhoff type of tank, was in operation for the last two months of the year. In addition to this large tank there are sixteen smaller tanks of the Imhoff type used for sedimentation of solid matter, giving a total sedimentation capacity of four-fifths of a million gallons. Before November there were about thirty Imhoff tanks used for sedimentation but the balance of these have since been converted into sludge digestion tanks.

The amount of solid matter abstracted by these tanks during the year was 37.4 per cent of the solids in suspension in the crude sewage, the monthly averages varying from 28.3 per cent to 46.5 per cent. These figures do not compare very favourably with similar results for previous years and I am of the opinion that the closing down of various tanks during the year for repairs and structural alterations has reduced the tank capacity considerably. Now that the Dorr tank is in operation the sedimentation of solids has improved considerably.

The solids in suspension entering these sedimentation tanks consisted of a mixture of organic and inorganic matter in the ratio of 7.2 to 1.0 and the sludge drawn off from the bottom of these tanks was found to have a corresponding ratio of 2.0 to 1.0.

The liquid effluent from the sedimentation tanks, which was regularly chlorinated, was slightly stronger in character than that treated during the preceding year. Nearly nine-tenths of this effluent were passed direct to the fifty-three large percolating filter beds, thirty six of which are called Blocks A, B and E and the remaining seventeen Blocks C & D.

For some reason not easy to explain the quality of the effluent after treatment in filter beds Blocks C & D was definitely less satisfactory than usual. The quality of the effluent from Blocks A, B and E is much better than usual, obviously due to the fact that it is no longer contaminated with untreated bio-flocculation unit effluent. This experimental bio-flocculation unit treated the 11.7 per cent of sedimentation tanks effluent which was not passed direct to the filter beds and the effluent from this experimental unit was filtered at a high rate through one or two of the filter beds in Blocks A, B & E. Previously the effluent from this experimental unit was not filtered.

SPECIAL INVESTIGATIONS RELATING TO SEWAGE PURIFICATION.

1. Bio-flocculation Treatment of Sedimentation tanks effluent.

This unit has, on the whole, worked well during the year, giving an effluent of a very similar quality to that obtained during the year 1932. The plant had to be closed down in January for the necessary structural alterations to allow the effluent to be pumped to three large percolating filter beds which had been reserved for this special treatment. When the unit was started up again considerable trouble was experienced in obtaining a heavy "sludge" which would not lose its compactness after being used for screening the suspended matter from the sewage under treatment. The difficulty was finally overcome by keeping less "sludge" in the reconditioning channels, thus allowing more thorough reconditioning of this sludge before passing back to the contact channels. The problem of always being able to maintain a compact, well reconditioned sludge is dependent on the character of the sewage treated and there must, in the case at Alexandra Road Works, always be a heavy daily strain on the unit between the hours of 8 a.m. and 4 p.m. when large quantities of crude night soil admixed with the water-borne sewage have to be treated. On the other hand there would probably be no need for a bio-flocculation unit in addition to filter beds if the water-borne sewage was free from strong, crude night soil.

Tables C & D, at the end of this report, give the averages and ranges of analyses of the effluents from this bio-flocculation unit and also from the two large filter beds, Nos. 39 & 40, which have been used during the greater part of the year for final treatment of the bio-flocculation unit effluent. For comparison the average analysis of the effluent from the filter beds Nos. 53, 54 & 55 treating Sedimentation tanks effluent direct, is shown.

Filter beds Nos. 39 & 40 were worked at rates from three to as much as five times more quickly than filter beds Nos. 53, 54 and 55 and

the results in Table C show clearly that the two effluents are of similar quality, the effluent from Beds Nos. 39 and 40 being, however, much more thoroughly oxidised. It is clear from these results that the removal before filtration of as much solid matter as possible in suspension results in infinitely better working of filter beds. This bio-flocculation unit has the very great advantage of being able to remove the very fine colloidal solid matter from the sedimentation tanks effluent. These solids are normally not dealt with very efficiently by simple filtration through coral.

2. Digestion of Sludge from the Sedimentation Tanks.

The normal type of sludge pumped from the sedimentation tanks after two or three months digestion contains an average moisture content of 95.9 per cent and a ratio of organic to inorganic matter of 2.02 to 1.0. If this sludge could be treated in such a way that it contained only one per cent less moisture i.e. 94.9 per cent, there would then be a diminution of the volume of the sludge of 20 per cent.

From special experiments it has been found that allowing the sludge to remain quiescent for a further month or so in the tanks, or in separate tanks reserved for the purpose, has no appreciable effect on the moisture content.

If the sludge is given further digestion in a tank fitted with a stirrer mechanism which has the effect of assisting settlement of solid matter, however, it has been found that the moisture content can be reduced to 93.8 per cent with a ratio of organic to inorganic matter of 1.8 to 1.0.

Special experiments are to be carried out with the sludge from the new mechanically stirred Dorr tank.

3. Treatment of Crude Night Soil in Tanks.

There is no doubt that the purification plant at Alexandra Road would work infinitely better if the sewage treated contained no dumped night soil. Experiments have been in progress for more than two years with a view to separate treatment of this night soil. In the last two annual reports will be found explanations of the experiments with the results obtained.

During 1933 the experiments have been carried out on a larger scale by using large digestion tanks and the results obtained are practically as good as those given in the last report.

The ratios of organic to inorganic matter with the moisture contents were as follows:—

	Moisture.	Organic Inorganic.
Night soil as added ..	96.15	8.15 to 1.0
After primary digestion ..	97.05	4.15 to 1.0
After secondary digestion ..	94.85	3.92 to 1.0

This sludge after secondary digestion is by no means fully digested and further experiments will probably be tried out in 1934.

4. Miscellaneous Experiments.

The two Imhoff tanks fitted with gas collectors treated less sewage during the year, with a consequent drop in the volume of sewage gas. The average volume was 5,000 cubic feet daily.

Figures were required towards the end of the year as to the degree of saturation with oxygen of the sea water round the coast of Singapore Island. Five days were spent round the coast and the 120 samples which were analysed have given all the information required. It was found that most of the sea-water was surprisingly near saturation point.

SEWAGE EFFLUENTS FROM HOUSE INSTALLATIONS.

Regular analyses were made of the effluents from the ninety two installations within the Municipal area (not including installations under Government control). The tanks were desludged at about three monthly intervals and the filter beds cleaned when found necessary from the chemical analyses of the effluent.

Of the ninety-two installations, thirty-six were maintained by the Commissioners, the remainder being in the hands of private firms or individuals. The following table gives a comparison of the average effluents for the year from these installations:

Parts per 100,000	AMMONIA		Oxygen Absorbed in 4 hours	Suspended Matter	Chlorides	Nitrates
	Free	Albuminoid				
Maintained by M.C.S.	0.67	0.11	0.98	3.5	4.0	2.2
Maintained privately	0.80	0.12	1.03	3.8	3.7	1.7

This table shows that all the plants are working satisfactorily, those maintained by the Commissioners being slightly better only than the remainder. I understand that all the purification plants will, in the near future, be maintained by the Municipality.

The total number of samples analysed during the year was 477. This number includes samples taken from both tanks and filter beds.

SAMPLES FROM HEALTH DEPARTMENT.

The 1,058 samples examined were obtained from various sources, principally through the Sanitary inspectors of the Health Department. They can be classified as follows:—

Samples examined in connection with Ordinance					
No. 139 (Sale of Food and Drugs)				..	749
Miscellaneous samples:					
Well waters	..	..	..	..	251
Various other waters	..	..	..	..	39
Human milk	..	..	..	..	6
Urine	..	..	..	..	8
Urinary calculus	..	..	..	..	1
Stools	..	..	..	..	2
Cat's stomach	..	..	..	..	1
Fertiliser	..	..	..	..	1

The following table gives the details of the samples analysed under Ordinance No. 139 and the Regulations under the Ordinance:

FOOD AND DRUGS SAMPLES.

SAMPLE	OFFICIAL		INFORMAL		Total
	Satis- factory	Unsatis- factory	Satis- factory	Unsatis- factory	
Milk and Milk Products:					
Fresh milk from itinerant vendors	216	84	..	1	301
Fresh milk from retail shops	55	4	59
Boiled milk from eating houses ..	2	16	..	..	18
Reconstituted milk	51	..	51
Tinned sterilised milk	1	1	2
Evaporated milk	20	..	20
Sweetened condensed milk	71	3	74
Infant food	4	..	4
Cheese	4	..	4
Ghee	2	..	..	2
Tinned Foods other than Milk:					
Pineapple	1	..	1
Green Peas	2	3	10	15
Bean curds	6	..	6
Margarine	1	..	1
Mutton	1	..	1
Brussels sprouts	1	..	1
Drugs:					
Aspirin	4	1	5
Ammoniated Tincture of Quinine	4	2	6
Borax	6	..	6
Eucalyptus oil	6	..	6
Olive oil	7	..	7
Camphorated oil	5	1	6
Phenacetin	1	..	1
Epsom salts	1	..	1
Proprietary "tea"	1	..	1
Tincture of iodine	1	2	6	4	13
Chinese medicines	3	..	3
Miscellaneous:					
Custard powder	4	..	4
Soda water from Fountains	46	12	58
Soda water from Factories	22	..	22
Pineapple juice	1	..	1
Whisky	7	2	1	..	10
Coffee	3	..	3
Sausage	8	2	10
Face powder	4	..	13	..	17
Boiled potatoes	1	..	1
Flour	1	..	1
Food colours	6	..	6
Lemon squash	1	..	1
TOTAL ..	230	108	370	41	749

A pronounced improvement has been noted in the quality of the milk retailed in the streets by itinerant vendors, although the amount of adulteration is still very great. Of 232 samples from licensed vendors, 53, or 22.8% were unsatisfactory, and of 68 from unlicensed vendors, 32 or 47% were not up to standard. Thus the unlicensed vendors are very much worse offenders than the licensed vendors. The following table gives the actual numbers of milk samples which were not up to standard.

ANALYSES OF MILK SAMPLES BOUGHT FROM ITINERANT VENDORS.

		Samples from Licensed Vendors	Samples from Unlicensed Vendors
Number of Samples		232	68
DEFICIENT IN NON- FATTY SOLIDS	Number Percentage	43 18.5	29 42.7
	Range of Deficiency	0.6% / 49.3%	1.2% / 47.7%
	Average Deficiency	9.25%	12.75%
DEFICIENT IN FAT	Number Percentage	13 5.6	9 13.2
	Range of Deficiency	1.5% / 43.0%	4.6% / 35.4%
	Average Deficiency	13.83%	21.10%

Three samples from licensed and six from unlicensed vendors were deficient in both non-fatty solids and fat. The proportion of unsatisfactory samples has fallen from 46.3% in 1931 to 32.8% in 1932 and 28.3% in 1933. An increase has occurred in the number of samples deficient in fat however making the year's results slightly worse than shown.

Samples of milk taken from eating houses revealed that really gross adulteration is carried out in these places. Out of eighteen samples, only two were satisfactory, and the average deficiency in non-fatty solids of the remainder was 37.0%. In one case it was 65.3%, practically two-thirds water and one-third milk.

The samples of fresh milk from retail shops and of reconstituted milk were satisfactory throughout the year, apart from one short period when the fresh milk was very slightly below standard with regard to non-fatty solids. This was brought to the attention of the firm concerned.

During the year, new Regulations came into force regarding condensed and dried milk, margarine and ghee. The ones relating to

condensed milk appear to be operating satisfactorily, as the change over to the new standards and labelling was almost complete in the prescribed time. One sample of tinned sterilised milk was slightly deficient in non-fatty solids, and three samples of sweetened condensed milk did not quite conform to the Regulations, but with the exception of these and the ghee samples, all the other milk products examined were entirely satisfactory.

The chief alterations in the requirements for condensed milk are that standards are now fixed for minimum fat and milk solids contents, and the label must include a statement reading "This tin contains the equivalent of——pints of milk" in place of the statement "To make milk not below the composition of fresh milk, add——parts of water." These Regulations are now standard throughout the Colony and F.M.S., and are in line with the English regulations.

The Regulations with regard to margarine have also been brought into line with the English regulations. The former regulations were ambiguous and excluded several perfectly good brands which conform to the new requirements.

There seems to be considerable misconception on the part of the consumers as to what constitutes "ghee". It is now defined as the pure clarified fat obtained from the milk of cow, buffalo or goat, free from any foreign substance. Two samples of ghee, purchased towards the end of the year (nearly twelve months after the adoption of this definition) contained only 21% and 16% of milk fat, and these were bought as No. 1 and No. 2 quality respectively. In view of the representations of various merchants as to the impossibility of obtaining pure ghee, no action was taken, and a further period is considered necessary before the Regulation can be enforced. Nothing can really be done until the ghee consuming public realises that any fat of a suitable consistency need not necessarily be ghee—in fact it usually consists essentially of vegetable fats. Such vegetable fats are naturally wholesome and edible but cannot in future be described or sold as ghee. In passing, it may be noted that four cheese samples were reported as genuine, in spite of the fact that they did not conform to the Regulation requiring whole milk cheese to contain in the water-free substance not less than fifty per cent of milk fat. Since almost all the well-known varieties of cheese fall short of this standard, it was considered that this section of the Regulations could not be operated as it stands.

The miscellaneous tinned foods call for no comment, except in the case of the tinned peas. There are still brands on the market (notably of Chinese origin) containing excessive amounts of copper, but their numbers are very low and the Inspectors have not been able to discover any big stocks, so that the position with regard to these may be regarded as much more satisfactory. There have been two prosecutions, but in both cases the stocks involved were quite small.

The drug samples were on the whole fairly satisfactory. The only serious cases were in connection with tincture of iodine. Four samples (two official and two informal) showed evidence of having been dispensed with methylated spirit in place of alcohol, and all were deficient in iodine and contained excess potassium iodine. Another informal sample contained a considerable amount of camphor. One brand of nominal 5 grain aspirin tablets contained only 4.33 grains of acetylsalicylic acid (aspirin) per tablet; one sample of ammoniated tincture of quinine

contained a slight excess and another was slightly deficient in ammonia and one sample of camphorated oil was deficient in camphor.

The new (1932) edition of the British Pharmacopoeia became official during the year, but no action has so far been taken in cases where a sample conformed to the 1914 specification but not to the new specification.

As in previous years, a check was kept on the aerated water factories and the small soda fountains. The factories were satisfactory throughout the year, and in a few cases where the water from the soda fountains showed traces of lead or copper, alterations or thorough cleaning of the machines produced satisfactory results. Two samples of whisky were below standard, but otherwise no objections could be raised to any of the miscellaneous samples. It appears that the efforts to stop the sale of face powders containing lead have been successful, as all the samples tested were free from lead.

Of 251 samples of well water only one could be regarded as satisfactory.

Samples from **other Departments** are summarised in the following table:—

	Engineering (including Municipal Stores)	Electrical Dept.	Gas Dept.	Water Dept.
Coal	25	471	43	7
Coke	3	..	233	..
Ashes .. .. .	..	25	..	..
Water and sewage	244	..	..	265
Sand, concrete, cement, etc. ..	8	..	..	5
Water and brine (abattoirs)	9	..	..	..
Glazed pipe	7	..	..	..
Coal gas .. .. .	..	..	10	..
Coal tar .. .. .	..	..	7	..
Spent oxide .. .. .	..	..	7	..
Gas liquor .. .. .	..	..	2	..
Light oil .. .. .	..	..	1	..
Corroded pipes and soil ..	..	..	..	2
Lime .. .. .	..	..	..	10
Sulphate of alumina .. ..	..	..	..	2
Cast iron .. .. .	..	..	..	1
Methylated spirit	1	..	..	..
Total ..	297	496	303	292

In addition, six samples of incinerator ash were analysed for the Town Cleansing Department, and one sample of a growth from a drain for the Improvement Trust.

The majority of the analyses of coal for the Electrical Department (St. James' Power Station) are required as quickly as possible and arrangements have been made to enable the results to be available within 24 hours of receipt of sample.

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The staff and the facilities of the laboratory are being utilised fairly generally now by all the departments of the Municipality but there is still a good deal of new ground to be covered and the Chinese laboratory assistants are coping excellently with the new work.

The course of lectures given to the Chinese staff by Mr. Clark on elementary and special branches of chemistry had to be discontinued during my absence on Home leave from September, 1932 until July, 1933 but I am hoping to continue these in the future.

I have pleasure in recording my thanks to the laboratory staff for their willing co-operation with Mr. Clark and myself in routine and research analyses throughout the year.

I have the honour to be,

Sir,

Your obedient servant

R. E. WILLGRESS,

A.R.C.S., B.SC., F.I.C.,

Municipal Analyst.

TABLE A.

Averages and Ranges of Monthly Analyses of Singapore and Johore Raw Waters for 1933.

Parts per 100,000	MacRitchie Reservoir		Peirce Reservoir		Sultan Ibrahim Reservoir		Pulai III Catchment		Pontian Keehil Reservoir	
	Range	Average	Range	Average	Range	Average	Range	Average	Range	Average
Total solids dried at 180°C	2.28 /3.44	3.03	1.68 /4.72	2.64	2.84 /3.88	3.22	2.28 /4.52	3.31	4.24 /6.72	5.13
Organic Matter ..	1.56 /2.60	1.97	1.16 /3.88	1.86	0.76 /1.80	1.35	0.84 /1.64	1.22	2.12 /4.04	2.83
Mineral Matter ..	0.52 /1.52	1.06	0.32 /1.16	0.78	1.36 /3.12	1.87	1.08 /3.04	2.09	1.76 /2.92	2.30
Total solids in suspension ..	0.16 /1.68	0.87	0.16 /2.08	0.76	0.12 /0.84	0.34	0.12 /1.04	0.50	0.24 /1.72	0.62
Free and Saline Ammonia .	0.001/0.004	0.0025	Absent/0.004	0.002	0.001/0.049	0.008	0.002/0.010	0.0045	0.002/0.024	0.007
Albuminoid Ammonia ..	0.002/0.020	0.0092	0.002/0.012	0.008	0.002/0.010	0.006	0.001/0.010	0.0053	0.002/0.016	0.009
Nitrites as Nitrogen ..	—	Absent	—	Absent	—	Absent	—	Absent	—	Absent
Nitrates as Nitrogen ..	—	Slight Trace	—	Slight Trace	—	Slight Trace	—	Slight Trace	—	Slight Trace
Oxygen absorbed in 3 mins.	0.015/0.038	0.028	0.023/0.068	0.036	0.015/0.040	0.024	0.014/0.045	0.023	0.042/0.071	0.056
Oxygen absorbed in 4 hours	0.062/0.115	0.094	0.076/0.163	0.110	0.065/0.100	0.082	0.050/0.189	0.091	0.127/0.265	0.185
Chlorides as Chlorine ..	0.1 /0.3	0.16	0.1 /0.3	0.15	0.1 /0.3	0.15	0.1 /0.4	0.2	0.1 /0.3	0.16
Iron 1. Total ..	0.025/0.11	0.074	0.03 /0.12	0.075	0.03 /0.35	0.077	0.045/0.13	0.066	0.045/0.11	0.071
2. In Solution ..	0.01 /0.065	0.034	0.02 /0.08	0.043	0.005/0.09	0.031	0.015/0.06	0.035	0.015/0.08	0.039
3. In Suspension ..	0.02 /0.06	0.04	0.02 /0.055	0.032	0.015/0.26	0.046	0.01 /0.07	0.031	0.005/0.06	0.032
Reaction—P.H. Value ..	7.2 /7.6	7.4	7.1 /7.6	7.4	7.0 /7.6	7.3	7.0 /7.6	7.3	7.0 /7.6	7.3
Alkalinity (as CaCO ₃) ..	0.1 /0.3	0.2	Absent/0.2	0.12	0.3 /0.6	0.43	0.2 /0.5	0.43	1.1 /1.8	1.44
Carbon Dioxide ..	0.15 /0.40	0.26	0.15 /0.35	0.24	0.30 /1.10	0.55	0.25 /0.80	0.47	0.20 /0.70	0.35
Colour in Lovibond 2 ft. Tintometer: 1. Yellow ..	2.5 /7.5	5.45	2.8 /8.4	5.0	1.7 /1.55	4.1	2.6 /8.0	4.2	3.0 /8.0	5.1
2. Red ..	0.5 /1.9	1.3	0.5 /2.0	1.26	0.2 /4.2	0.9	0.5 /2.1	1.0	0.7 /1.8	1.3
3. Blue ..	0.1 /0.3	0.12	0.1 /0.3	0.12	0.1 /0.5	0.15	0.1 /0.1	0.1	0.1 /0.9	0.2

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TABLE B.

Averages and Ranges of Monthly Analyses during 1933 of
Singapore Tap Supply.

PARTS PER 100,000	HAVELOCK ROAD TAP SUPPLY		COLEMAN STREET TAP SUPPLY	
	Range	Average	Range	Average
*Total solids dried at 180°C	3.12 /4.52	3.69	2.08 /4.12	3.23
Organic Solids ..	0.96 /2.20	1.61	0.68 /2.00	1.43
Mineral Matter ..	1.48 /2.76	2.08	1.08 /2.36	1.80
Total Solids in Suspension	0.08 /1.28	0.38	0.08 /1.80	0.37
Free and Saline Ammonia	0.001/0.10	0.003	0.001/0.005	0.002
Albuminoid Ammonia ..	0.001/0.008	0.005	0.001/0.008	0.004
Nitrites as Nitrogen ..	—	Absent	—	Absent
Nitrates as Nitrogen ..	—	Slight Trace	—	Slight Trace
Oxygen absorbed in 3 mins.	0.005/0.002	0.013	0.005/0.030	0.014
Oxygen absorbed in 4 hours	0.018/0.077	0.044	0.014/0.066	0.035
Chlorides as Chlorine ..	0.1 /0.3	0.16	0.1 /0.3	0.16
Iron 1. Total ..	0.01 /0.03	0.02	0.01 /0.025	0.02
2. In solution ..	—	—	—	—
3. In suspension ..	—	—	—	—
Reaction—P.H. Value ..	7.2 /7.6	7.4	7.2 /7.6	7.4
Alkalinity as (CaCO ₃) ..	0.7 /1.2	0.9	0.7 /1.1	0.88
Carbon Dioxide ..	0.20 /0.40	0.28	0.2 /0.5	0.31
Colour in Lovibond 2 ft.	—	—	—	—
Tintometer: Yellow ..	0.5 /1.3	0.96	0.5 /1.3	0.94
Red ..	0.1 /0.3	0.12	0.1 /0.3	0.12
Blue ..	0.1 /0.7	0.24	0.1 /0.7	0.24

* PERCENTAGE COMPOSITION OF SOLID MATTER.

Calcium carbonate	..	..	..	..	32.8
Calcium sulphate	..	..	..	..	3.3
Magnesium sulphate	..	..	..	..	4.6
Magnesium chloride	..	..	..	..	2.2
Sodium chloride	..	..	..	..	6.9
Iron (as iron oxide)	..	..	..	..	.7
Silica	..	..	..	..	14.9
Mineral matter				..	65.4
Organic matter				..	34.6
Total				..	100%

TABLE C.

Average of Daily Analyses of Crude Sewage and Effluents from Alexandra Road Sewage Works during 1933.

PARTS PER 100,000	AMMONIA		Oxygen absorbed in 4 hours	Suspended Matter	Nitrates as Nitrogen	Chlorides as Chlorine	Dissolved Oxygen absorbed in 3 days	P. H. Value
	Free	Albuminoid						
Crude Sewage	4.50	1.20	11.31	38.7	—	29	—	7.0
Detritus Tank Effluent	—	—	—	35.2	—	—	—	—
Dorr Tank Effluent	4.85	0.77	6.66	19.3	—	36	—	—
Imhoff Tank Effluent	5.00	0.90	7.83	20.3	—	34	—	—
Bio-Flocculation Effluent	4.90	0.60	4.02	6.8	—	35	8.62	7.3
Effluent Filter Bed E	0.51	0.13	1.21	1.5	2.1	36	0.83	—
Effluent Filter Beds Nos. 39, 40 & 41	0.54	0.14	1.22	1.3	3.2	25	0.92	—
Effluent Filter Beds Nos. 53, 54 & 55	0.44	0.12	1.16	1.5	1.9	33	0.88	—
Humus Tanks' Effluent {	0.81	0.13	1.30	0.9	1.6	36	0.83	—
	0.90	0.13	1.27	1.0	0.8	34	0.97	—

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TABLE D.

Ranges of Daily Analyses of Crude Sewage and Effluents from Alexandra Road Sewage Works during 1933.

PARTS PER 100,000	AMMONIA		Oxygen absorbed in 4 hours	Suspended Matter	Nitrates as Nitrogen	Chlorides as Chlorine	Dissolved Oxygen absorbed in 3 days	P. H. Value
	Free	Albuminoid						
Crude Sewage	2.50/7.00	0.30/2.60	3.74/14.58	7.8/60.5	—	11/120	—	6.7/7.3
Detritus Tank Effluent	—	—	—	7.0/53.5	—	—	—	—
Dorr Tank Effluent	3.00/7.50	0.20/1.80	4.40/ 8.20	10.5/27.0	—	14/ 99	—	—
Imhoff Tank Effluent	2.40/7.40	0.20/2.10	3.45/10.46	6.9/33.8	—	14/103	—	—
Bio-Flocculation Effluent	1.20/7.50	0.10/1.50	1.78/ 6.55	2.4/15.2	—	15/ 89	3.13/15.18	7.2/7.4
Effluent Filter Bed E	0.16/1.04	0.04/0.20	0.87/ 1.79	0.5/ 4.6	0.7/4.0	15/ 99	0.33/ 1.47	—
Effluent Filter Beds Nos. 39, 40 & 41	0.10/1.84	0.06/0.42	0.71/ 2.64	0.5/ 4.6	1.3/5.6	14/ 63	0.29/ 3.53	—
Effluent Filter Beds Nos. 53, 54 & 55	0.12/1.4	0.02/0.34	0.76/ 2.67	0.5/ 5.6	0.6/4.1	14/101	0.29/ 4.18	—
Humus Tanks' Effluent	0.40/1.60	0.02/0.24	0.84/ 1.96	0.5/ 3.2	0.9/4.1	15/106	0.38/ 1.65	—
	0.34/2.00	0.02/0.28	0.86/ 2.12	0.5/ 3.1	0.1/2.5	12/113	0.34/ 2.12	—

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BACTERIOLOGICAL LABORATORY,

SINGAPORE, 22nd February, 1934.

THE MUNICIPAL HEALTH OFFICER,

SINGAPORE.

SIR,

I have the honour to report on the work done in this department during the year 1933.

I. PUBLIC HEALTH EXAMINATIONS.

Twenty-six thousand, nine hundred and forty-eight specimens were received, involving 32,686 examinations as compared with 30,503 examinations last year. This is again a record for the laboratory.

MALARIA.

Three thousand nine hundred and twenty-three blood films were received, 140 less than last year. Malaria parasites were found in 521, or 13.2 per cent. a slightly higher percentage than last year. There were 213 subtertian infections, 301 benign tertian, 4 quartan, and 3 mixed subtertian and benign tertian. Johore Water Works furnished 36 positive films. the Health Office 189, and practitioners 296.

TUBERCULOSIS.

Human Specimens.—1,318 specimens of sputum, 12 of faeces, 5 of urine, 5 of pus, and 21 of pathological exudates were examined. The tubercle bacillus was demonstrated in 315 specimens of sputum, 2 of faeces, 2 of urine and 2 of pus.

Animal Specimens (Swine).—3 glands, 3 lungs, 1 liver, 1 spleen and 1 kidney were examined and acid fast bacilli were demonstrated in 1 gland and in the spleen.

The diagnosis was confirmed in one case by inoculation into a guinea pig, in which a generalized infection was produced.

Animal Specimens (Oxen).—11 glands, 5 lungs, 2 livers, 1 spleen, 1 kidney, 2 specimens of pleura and 1 of peritoneum were examined. Tubercle bacilli were found in 8 glands, 4 lungs, 1 liver and in the spleen.

Animal Specimens (Goats).—1 specimen of lung was received and proved to be tubercular by histological examination.

Fowls.—1 specimen of lung was received but no acid fast bacilli were found, nor was the histological picture typical of tubercle.

Milk.—53 specimens of milk were examined. Acid fast bacilli were found in none. Three of them were injected into guinea pigs but failed to produce Tuberculosis.

TYPHOID AND PARATYPHOID FEVERS.

Eight hundred agglutination tests were made, and 50 sera gave a positive reaction with the *Eberthella typhi*, 7 gave a positive reaction with *Salmonella paratyphi* (*B. paratyphosus* A), and 11 with *Salmonella schottmulleri* (*B. paratyphosus* B). The *Eberthella typhi* was isolated from 1 specimen of blood out of 34, and from 5 out of 396 specimens of faeces. Two hundred and sixty-nine specimens of urine were examined of which 1 was positive.

Complement fixation tests with the *Eberthella typhi* as antigen were made on 225 specimens of blood and in 28 cases a positive complement fixation test was obtained.

Two specimens of ice cream were examined with negative results.

The very large number of agglutination tests as compared to last year is due to the inclusion of tests done on hawkers. During the early part of the year it was noticed that an abnormally large number of cases of Enteric Fever were occurring among school children. In an endeavour to trace the source of infection 281 hawkers were examined. Two of these were found to be excreting the *Eb. typhi* in their stools. No urinary carriers were found. It was possible to examine only one specimen from each individual so that it is almost certain that other carriers were missed. Two hundred and twenty-five complement fixation tests were done on the blood of these hawkers using *Eb. typhi* as antigen. The results were completely negative in 201 samples, and positive in 18, while 6 samples were anticomplementary. In 4 cases the Widal reaction was positive, in a dilution of 1 in 10 only, but in only 1 case were both Widal and Complement Fixation tests positive. Blood from 4 known cases of enteric fever under treatment at the General Hospital and from one case of enteric at St. Andrews Hospital were used as positive controls, and the blood from an infant of 3 months as a negative control. In no case were bacilli of the enteric group isolated from any of the patients whose blood as positive.

DYSENTERY.

Amoebic.—One thousand three hundred and fifty-six specimens were examined. The *E. histolytica* was present in 50 and *E. coli* in 19.

Bacillary.—Three hundred and forty-seven specimens were received, and *B. dysenteriae* of Flexner was isolated from 5 and Hiss and Russel's bacillus from 3. The examination was carried out in nearly all of these samples only because it was asked for. From only a few of the samples could positive results be expected.

CHOLERA.

No specimens were received.

PLAGUE.

Five specimens were received in 3 of which the *Pasteurella pestis* was demonstrated, microscopically and by culture, and confirmed by animal inoculation. The positive material came from one case which occurred in April. The patient was infected at Boat Quay and died in the Middleton Hospital.

Rats.—Five thousand one hundred and seventy-nine rats were dissected, one of which was infected with plague. Five hundred and thirty-five rats came from the Port Area or Ships at the wharves and the

remainder were trapped in the town. The proportion of rattus to decumanus in the port and ships was 3 to 1, and in the town 1 to 6. The species and distribution of the rats dissected was as follows:—

Source	R. decumanus		R. rattus		Concolor		Musculus		Croci- dura	Total
	M	F	M	F	M	F	M	F		
Port ..	50	80	164	232	4	5	—	—	—	535
Town ..	1,124	1,806	176	263	149	321	12	58	735	4,644
Total ..	1,174	1,886	340	495	153	326	12	58	735	5,179
	3,060		835		479		70		735	5,179

Of 32 dead rats brought to the laboratory from Boat Quay one (a male musculus) was found infected with plague. This musculus had died only a short time before being brought to the laboratory and the only sign of the disease was an enlarged, firm, moulded, and mottled spleen. This organ swarmed with *B. pestis*; which were confirmed as such by inoculation into a guinea pig. Most of the dead rats had been reduced to skin and bone by maggots, some being merely bags of skin containing bones, and empty pupa cases from which flies had emerged, while others still contained living maggots. The presence of pupa cases and maggots indicated that these rats died only a short time before and that the outbreak was probably a fresh infection lately introduced. No more infected rats were found during the year.

Two batches of fleas from rats at Boat Quay were crushed and cultured but the *B. pestis* was not isolated.

Fleas. Three thousand and one fleas were caught or 60 per hundred rats. The index was 100 for the port and 50 for the town. The flea index is slightly lower than last year. The index in the town varied from 30 to 70 but there were greater variations in the Port Area, the lowest index there being 20 in April and the highest 230 in July. No identification of fleas was done during the year.

CEREBRO-SPINAL FEVER.

Thirty specimens of cerebro-spinal fluid were received and the meningococcus was found in three.

DIPHTHERIA.

Three thousand nine hundred and ninety-nine specimens were examined from 624 of which the *Coryn. diphtheriae* was isolated in culture. Eight hundred and ninety swabs came from the inspecting officers and the *Coryn. diphtheriae* was found in 31 of these. Thirty-five cultures were tested for virulence of which 12 were virulent. Diphtheria continues to increase in Singapore as elsewhere. A collection of over 100 local strains has been made with a view to seeing where there are any "gravis" forms among them. Typical "gravis" and "mitis" strains were obtained from the Institute of Medical Research, Kuala Lumpur but just as the investigation was getting under way, it had to be stopped owing to the search for typhoid carriers among hawkers mentioned above. Strains intermediate between "gravis" and "mitis" were found, and the study will be resumed as other work permits.

LEPROSY.

Seventy-two specimens were examined and the *My. leprae* was demonstrated in 20.

Miscellaneous included:—

488	specimens of	Urine for General Examination.
84	„	Pathological Exudates for General Examination.
2	„	Urine for Gonococci (2+ve).
1,200	„	Pus for Gonococci (171+ve).
15	„	Prostatic Smears for Gonococci (1+ve).
4,209 (1)	„	Faeces for intestinal parasites.
2,340 (2)	„	Blood for Wassermann Reaction (391+ve).
8	„	Cerebro-Spinal fluid for Wassermann Reaction (—ve).
7	„	Cerebro-Spinal fluid for Kahn Reaction (—ve).
2,226	„	Blood for Kahn Reaction (405+ve).
780	„	Blood (Rat) for Trypanosoma lewisi (96+ve).
7	„	Sera for T. Pallida (—ve).
5	„	Blood for Filaria (1+ve).
1	„	Sputum for Pneumococci (+ve).
46	„	Blood for Differential Count.
4	„	Hair or skin for Ringworm fungus.
1	„	Tinned Fish for Food Poisoning.
3	„	Ice Cream.
51	„	Pathological Tissues for section.
12	„	Vaccine.
104 (3)	„	Milk.
7	„	Disinfectants.

(1) Intestinal parasites. Out of 4,209 specimens 445 contained ankylostome ova, 6 had strongyloids, 785 ascaries ova, 1,033 trichuris ova, 30 oxyuris, 2 tapeform, and 24 lamblia cysts while 5 contained intestinal flagellates.

(2) Wassermann Reactions. 2,340 samples of blood and 8 of cerebro spinal fluid were received and 10 remained over from last year, 4 remained over at the beginning of this year. Including repetitions 2,360 reports were issued.

The results were as follows.

	Positive	Negative	Doubtful Positive	Doubtful Negative	Anti Comple- mentary	Total
L. M. O. ..	202	949	19	7	21	1,198
Middleton Hospital .	14	37	—	1	2	54
St. Andrews Hospital	64	379	6	9	12	470
Health Office ..	6	16	—	—	—	22
Registrars ..	81	476	6	5	2	570
Others ..	2	44	—	—	—	46
	369	1,901	31	22	37	2,360

The Kahn reaction was done on 2,211 specimens, and agreed with the Wassermann reaction in 2,090 or 95 per cent. of all cases, of which 332 were positive and 1,758 negative. In 50 cases the Wassermann was

positive and the Kahn negative and in 71 the Wassermann was negative and the Kahn positive. The Kahn reaction was done on 28 specimens of blood that were anti-complementary and was positive in 12 and negative in 16.

The percentage agreement in the different series to nearest whole numbers is as follows:—

Source			Agreed	W+ K—	W— K+
Lady Medical Officer	..		95 per cent	3 per cent	2 per cent
Middleton Hospital	..		82 " "	8 " "	10 " "
St. Andrews Hospital	..		93 " "	5 " "	2 " "
Health Office	..	..	90 " "	5 " "	5 " "
Registrars	..	..	96 " "	1 " "	3 " "
Others	..	..	96 " "	0 " "	4 " "

The agreement between the two tests is good except in the case of the specimens from the Middleton Hospital. Fourteen of these specimens came from patients who had skin rashes which resembled one or other of the specific infectious exanthemata but which might conceivably be syphilitic. In this group there was 100 per cent. agreement between the Wassermann and Kahn 8 being positive to both tests and 6 negative. The rest of the specimens 40 in number were from patients recovered from Chicken-pox and here there was only 72 per cent. agreement, 10 per cent. being Wassermann positive and Kahn negative, and 12 per cent. Wassermann negative and Kahn positive while 5 per cent. were anti-complementary.

The specimens from the Registrars consist almost entirely of blood from mothers whose children had died under two years of age. The practice of taking a specimen of blood from these mothers was started last year and at the end of 1933 1,032 specimens had been examined. Both Wassermann and Kahn reactions were done on 962 of these of which 15 per cent. were positive to both tests, and 80 per cent. negative while 3 per cent. were Wassermann positive and Kahn negative and 2 per cent. Wassermann negative Kahn positive. In 798 cases the age of the child at death was notified to the Laboratory and the results are as follows.

Age of child	W +	K +	W —	K —	W +	K —	W —	K +	Total
Still born ..		35		101		1		1	138
Under 24 hours		5		26		—		1	32
3 months ..		31		265		3		8	307
6 months ..		22		99		2		3	126
1 year ..		14		114		2		—	130
2 years ..		3		60		2		—	65
Over 2 ..		—		—		—		—	—
		110		665		10		13	798

W+ = Wassermann positive.

W— = Wassermann negative.

K+ = Kahn positive.

K— = Kahn negative.

Thus the mothers of 14 per cent. of children dying under 2 years old are syphilitic while 25 per cent. of those whose children are still born are syphilitic. An endeavour was made to find out when taking the blood sample from the mother whether she was pregnant then or not and of those who replied in the affirmative 15 per cent. were syphilitic as judged by the result of the Wassermann and Kahn tests together.

(3) **Milk.**—104 samples of milk, raw and pasteurized, were examined. The results can be summarized as follows. Of the raw milk 4 per cent. of samples had over 200,000 colonies per ml. 96 per cent. had between 100,000, and 200,000, 86 per cent. between 100,000, and 10,000, and 46 per cent. between 10,000 and 1,000 and 6 per cent. had less than 1,000. The coli content of the raw milk was; 18 per cent had no B. coli in 10 ml., 82 per cent. had B. coli present in 10 ml. 64 per cent in 1 ml. and 19 per cent in 0.1 ml.

Of the pasteurized milk 94 per cent of samples were up to the standard of Grade A Pasteurized Milk in that the total number of colonies was under 30,000 per ml. In 80 per cent. the colonies numbered less than 10,000 per ml. and in 6 per cent less than 1,000. Ninety-four per cent. were up to standard as regards B. coli content i.e. had no B. coli in 0.1 ml.

Three samples of ice cream were examined, with a view to the possibility of establishing some standard. At present there are no bacteriological standards for food stuffs in Singapore.

II. WATER.

Seven thousand, eight hundred and thirteen routine samples from the Municipal supply were analysed, an increase of eight hundred and eighty-six on last year. The results, tabulated below, show that a pure drinking water was supplied during the year. It will be noticed that the results at the filter plant at Gunong Pulai are particularly good the average number of organisms per ml. being reduced from 592 to 16 and 99 per cent. of the samples having no B. coli in 100 ml. Samples taken at various times along the pipe line proved that no contamination was entering and that the standard obtained at the filter plant was maintained all along the line. It was discovered during the year that the puzzling results mentioned in last year's report at Pearl's Hill, were due partly to material falling into one of the divisions of the reservoir from the under side of the roof, and partly to a defective valve in the pipe line. When that half of the reservoir was cut off and the valve repaired the counts immediately improved, and this improvement has been since maintained. There was no question at any time of dangerous contamination entering the reservoir.

The following table summarizes the results obtained from the chief parts of the water supply system during the year.

Source	Number of Orga- nisms on Agar	Lactose Fermenters present in							
		—100	+100	+10	+1	+0.1	+0.01	+0.001	—
Sultan Ibrahim V. T. ..	592	11.3	88.7	48.7	16.2	0.8	—	—	—
Sultan Ibrahim C. W. T.	16	99.1	0.9	0.4	—	—	—	—	—
Seletar Reservoir ..	381	2.9	97.1	77.1	24.6	1.7	—	—	—
Pierce Reservoir ..	172	5.4	94.6	50.4	8.7	—	—	—	—
MacRitchie Reservoir V.T.	183	1.7	98.3	81.2	18.7	0.4	—	—	—
Bukit Timah Raw 99 Days	255	1.0	99.0	66.7	13.1	—	—	—	—
Woodleigh Raw 194 Days	177	23.2	76.8	32.0	2.1	—	—	—	—
Pearl's Hill I (Tank) ..	117	45.4	54.6	12.1	0.4	—	—	—	—
Pearl's Hill II 143 Days	109	32.2	67.8	18.9	—	—	—	—	—
Fort Canning Reservoir .	73	94.6	5.4	1.2	—	—	—	—	—
Tap (Office) ..	68	95.4	4.6	—	—	—	—	—	—
Tap (Lorong Lalat) ..	93	96.2	3.8	0.9	—	—	—	—	—
Tap (Havelock Road) ..	210	77.1	22.9	4.2	—	—	—	—	—
Tap (Average of 3 taps)	123	89.6	10.4	1.7	—	—	—	—	—

During the year algae were a source of great trouble to the Water Engineers and of not a little expense. They first appeared in quantity in the water of Pierce Reservoir during March. It was found that the filters at Woodleigh rapidly developed an enormous head in 24 hours. The water became cloudy and yellowish in colour, and when looked at in bulk had a decided greenish tint. This colour was found to be caused by the presence of vast numbers of a green alga. I was able provisionally to identify the organisms as belonging to the genus *Cosmarium* and Mr. Holttum, and Mr. Corner to whom samples were submitted identified it as probably *C. pygmaeum*, reported from Java, and one of the smallest algae known. In Pierce Reservoir the numbers varied from 21,000 to 11,000 per ml. Specimens sent to the late Sir Alexander Houston, arrived disintegrated. The treatment of a water infested by green algae is the addition of Copper Sulphate but as there is danger of destroying the fish in a reservoir where it may be difficult to ensure thorough mixing of the chemical, as would be probably the case here, and as a plentiful supply of water from other sources was available, it was decided to stop using the reservoir and allow natural purification to take place. On the 18th of May the water had improved sufficiently to be used again and in June the water was clear and sparkling and the filters were giving a bluish tinted water. It was proved that these algae were not carried down by any of the streams feeding the reservoir and it is impossible to say where they came from. In May, Pontian Reservoir became infected and remained so until the end of the year. The number of samples examined microscopically as a result of this infection with *Cosmarium* was 307. It is fortunate that no outbreak of *Crenothrix polyspora* followed on the resting of a water so heavily infested by algae, as both Pierce Reservoir and Pontian Reservoir have been. One hundred and seventy-nine miscellaneous samples were examined.

The water from Mount Emily Swimming Pool was examined twice daily and proved to be clear and safe bacteriologically. Some workers have found that the chlorine in the water has a persistent action and that samples examined a short time after being taken prove to be better than those examined on the spot. To prevent this action they recommend that Sod. Thiosulphate be added to the sample bottles so as to dechlorinate the water. From July onwards all sample bottles sent to Mount Emily contained Sod. Thiosulphate. No striking difference in the counts was noted. The average results for the year are seen below.

Source	Total Counts	Lactose Fermenters present in				
		— 100	+ 100	+ 10	+ 1	+ 0.1
Shallow End 7 a.m. ..	42	73.1	26.9	7.2	1.7	0.4
Deep End 7 a.m. ..	58	59.7	40.3	13.4	2.9	0
Shallow End 2 p.m. ..	27	87.4	12.6	3.3	0.8	0
Deep End 2 p.m. ..	25	92.0	8.0	3.0	1.3	0

III. SEWAGE.

Fifty-one samples of chlorinated effluent from the Middleton Hospital were examined. Excluding one big count in March the average number of organisms per ml. was 3,300. Ten per cent. of samples had no *B. coli* in 100 ml. *B. coli* was present in 100 ml. in 90 per cent. of samples, in 10 ml. in 56 per cent., in 1 ml. in 26 per cent., in 0.1 ml. in 23 per cent., in 0.01 in 9 per cent. and in 0.001 ml. in 4 per cent. This is a considerable improvement on last year. Forty-two samples of wash water from the Conservancy Department were examined and were satisfactory. The absence of *B. coli* in 100 c.c.c. was always confirmed by plating from the 100 c.c. sample tube.

Forty-three samples of sludge from the reconditioning tanks of the Bioflocculation unit were examined microscopically during the year. The most striking feature was the comparative absence of protozoal life, and the enormous numbers of spirilla present, on most occasions when samples were taken.

The study of nematode larvae in the sludge digestion tanks and drying beds was continued. Actively dividing *Ascaris* ova were found. The heating apparatus however requires further development and improvement.

IV. MORTUARY.

There were 15 post mortem examinations during the year. The causes of death were:—

Diphtheria	...	...	...	4
Septicaemia	...	...	..	2

(79-D)

Broncho-pneumonia	...	..	...	2
Lobar pneumonia	..	...	...	1
Bronchitis	...	...	...	1
Whooping Cough	...	...	..	1
Tuberculosis	...	...	...	1
Malaria	...	..	...	1
Diarrhoea	...	...	...	1
Cerebral Oedema	..	...	...	1

I have the honour to be,

Sir,

Your obedient servant,

COLIN C. B. GILMOUR,

M.A., M.B., CH.B.,

Municipal Bacteriologist.

MUNICIPAL HEALTH OFFICE,

SINGAPORE, 17th March, 1934.

THE MUNICIPAL HEALTH OFFICER,

SINGAPORE.

SIR,

I have the honour to submit the following report of the work done in the Infant Welfare Department for the year 1933.

14,190 new babies were taken on the Clinic Registers. This figure represents 84% of the total births, compared with 87% for the year 1932. The number of Clinic Consultations—49,237—shows an increase of 8,022 over the number for the previous year. The Health Visitors paid a total of 106,817 visits, which is an increase of 9,625 compared with the number of visits last year. The marked increase in the already large number of visits paid to the three Clinics is partly due to the continuance of unemployment and the real poverty that it entails. Cases of semi-starvation are frequently seen—not only in the babies, but in their mothers, and also in the older children who frequently accompany them to the Clinics. Very young babies are being fed on “Buboh,” not so much out of ignorance but because rice is the cheapest food obtainable, although it is often difficult to persuade some of the mothers, who are anxious to feed their children, well, that a small baby does not require such extra “food,” as “Buboh,” or cornflour. Free milk was given to as many poor cases as possible, and 20,480 tins of condensed milk were distributed during the year. This represents a sum of \$3,621. It is true that some of the mothers come to the Clinics, asking for free milk which they could really afford to buy, but the percentage is very small indeed. All “milk cases” are carefully investigated, and for every **one** baby who may obtain free milk under false pretences, there must be **ten** who actually require more than we are able to give. Many babies are brought to the Clinics for the treatment of boils, diarrhoea and conjunctivitis (often gonorrheal), but the chief troubles seem to be “coughs” and stomach conditions, due either to errors in feeding or dirty bottles. Many mothers come to the Clinics for advice and treatment for themselves, and a large number of them are found to be suffering from beri-beri, directly due to under-feeding and aggravated by their recent confinement.

Improper diet, dirty feeding bottles and the giving of “Chinese medicine” still account for much of the infantile morbidity and death, but a few of the prejudices are disappearing gradually. The fear of undressing (or washing) a sick baby has been to some extent overcome by the baths given at the Clinics, but the proper dietetic treatment of the mothers with beri-beri is still very difficult, as it is in direct opposition to their firmly rooted beliefs regarding the “right” way to feed a mother in the puerperal state, both for the “safety” of the mother and child. Although all mothers whose babies (or they themselves) require Hospital treatment are urged to go to Hospital, only about 40% of them will consent to do so, whether for treatment as “In” or “Out” patients. The teaching of Mothercraft is slow, uphill work, and is made more difficult by the fact

that a Chinese baby is so often left in the charge of its old grandmother or other relative, and its own mother is not seen. Often she is out working as the sole supporter of her family, which explains, in part at least, the very small number of purely breast-fed babies seen at the Centres—another possible cause being the under-feeding of the mothers.

It is gratifying to note, that, in spite of the still prevailing adverse conditions, the Infantile Death Rate for 1933 is the lowest on record—176.5 per thousand.

The two Municipal Midwives attended 579 poor cases, paying a total of 3,649 visits. There were 28 cases seen by the "Municipal Panel" Doctors and 401 cases were sent to Hospital for treatment. All these figures correspond closely to those of last year, and require no special comment, save that the number of poor maternity cases attended free of charge by the Municipal Midwives remains disappointingly small. It is hoped, however, that by means of "advertising" the existence of these Midwives (which will be outlined later in this report), the numbers of the cases attended by them will increase.

The District Sisters paid a total of 19,398 visits, i.e. 14,666 first visits, 3,876 re-visits, and 856 visits to "wrong addresses"—755 cases were untraced. The "wrong addresses" and the "untraced" cases show a marked improvement in those of the previous year (compare 1,031 and 684 respectively). This improvement is due to the more accurate information given by parents and midwives at the Registration of Births Office, and represents much time saved for visits to correct addresses. Of the 14,666 mothers who were visited, 836 were found to be ill, 40 had died, and 182 had removed, or were out. The large majority (10,089), lived in cubicles or single rooms, and many (3,873), had had no skilled attention at their confinements. These figures show a slight decrease in the number of mothers living in cubicles or single rooms, but an increase in the number of self-attended confinements, as compared with last year's figures, (10,279 and 3,452 respectively). This increase in the number of self-attended cases which can only be accounted for, by the prevailing poverty, is to be deplored, and it is hoped that (1) by means of "propaganda" through the medium of the Health Visitors, who have been instructed to urge all expectant mothers whom they find, when visiting, to attend one of the Municipal Clinics, both for ante-natal advice and treatment and also for the purpose of "booking" the free services of one of the Municipal Midwives (2) by the erecting of notice boards to this effect, printed in several languages, outside each Clinic, that there will be an appreciable decline in these cases.

Of the 14,571 births notified (this includes 85 pairs of twins) 13,916 infants were actually seen by the four District Sisters. The remaining 835 were either still-born (286), had died (182), or had been given away or were being nursed out (367). It is possibly an indication of the existing poverty that there is an increase in the number of children "given away or nursed out."

In adding my own observations of the past three months to the notes left by my predecessor, Dr. Crowe, I can only agree with her, in the opinion that inherited Syphilis is by far the most important cause of infantile mortality, and the investigations carried out by Dr. Crowe and those done since, corroborate those made in 1931 and 1932. The practice of testing the blood of all the mothers whose babies fail to thrive, has been continued throughout the year, and 927 mothers have had their

blood tested in the Clinics. 750 were negative, and 8 had anti-complementary serum and 169 or 18.23% were suffering from Syphilis, as evidenced by the serological tests. This figure is much lower than the 32% for last year, but it is still quite high enough to be reckoned as a serious cause of infantile mortality. The drop from 32% to 18% positive reactions is largely due to the fact that the blood test has become a routine one, to which the mother readily submits if her baby be ailing in any way. When the taking of blood for the Wassermann Test was first introduced into the Clinics in 1931, about half the mothers objected to it. To-day a refusal is very rare—in some cases both the father and the mother come to the Clinic and ask to have their blood tested.

It must be remembered that a negative Wassermann does not exclude the presence of Syphilis—particularly in the case of the women—many of our “negative” mothers have infants in whom the signs and symptoms of spirocheatal infection are only too obvious.

11 of the 26 babies tested gave a positive result i.e. 42.3% but they were all children of Wassermann positive parents. The 244 men tested were all husbands of “positive” women, or fathers of Syphilitic children, yet only 82 had definitely positive Wassermann results i.e. 33.6%

“Positive” results must therefore be taken as a minimum indication of the prevalence of congenital Syphilis, “clinically” positive cases being about twice as numerous.

I have the honour to be,

Sir,

Your obedient servant,

MURIEL G. E. CLARK, .

Lady Medical Officer.

MIDDLETON HOSPITAL,

SINGAPORE, 29th January, 1934.

THE MUNICIPAL HEALTH OFFICER,
SINGAPORE.

SIR,

I have the honour to present the annual report of the Middleton Hospital for the year 1933.

The following table summarises the cases treated during the year.

Disease			Remaining from 1932	Admitted	Discharged	Died	Remain- ing
Smallpox	...	...	—	1	—	1	—
Cholera	...	...	—	—	—	—	—
Plague	...	...	—	1	—	1	—
Chickenpox	...	...	24	252	268	—	8
Measles	...	...	—	110	102	5	3
Diphtheria	...	...	3	159	108	45	9
Cerebro-Spinal Fever	...	...	—	3	1	2	—
Erysipelas	...	...	—	2	1	1	—
Whooping Cough	...	...	—	8	4	3	1
Mumps	...	...	1	178	171	—	8
Rubella	...	...	—	1	1	—	—
Typhoid Contacts	...	...	—	281	281	—	—
Diphtheria Contacts	...	...	—	30	27	—	3
Tuberculosis	...	...	—	3	2	1	—
Other Diseases	...	...	—	46	30	16	—
For observation	...	...	—	85	76	—	9
Total	...	...	28	1,160	1,072	75	41

The large number of admissions is due to the fact that 281 hawkers were admitted for examination to detect possible Typhoid carriers, but allowing for them, and for the Diphtheria contacts admitted, the number of cases treated is a record for the Hospital and this has occurred with only one case of Smallpox and one of Plague. Though the great epidemic diseases Smallpox, Cholera and Plague, may again appear in epidemic form in Singapore it would seem that the role of the Hospital in the future will become less and less that of an isolation camp for these diseases and more and more that of a Hospital for the treatment of the ordinary infectious diseases of childhood and their sequelae.

Smallpox. One case was admitted, of the confluent type and proved fatal. The patient was an Indian and showed no definite vaccination marks.

Cholera. No cases were admitted during the year.

Plague. One case was admitted and proved fatal. The patient was an Indian working at Boat Quay.

Diphtheria. This was the most serious disease and accounted for three fifths of the deaths during the year. One hundred and fifty-nine cases were admitted, compared with 90 last year, and 45 died a crude mortality of 28 per cent. Thirty patients of whom 11 were practically moribund died within 24 hours of admission. Excluding these the mortality was 11.6 and 2.2 per cent. higher than last year. Forty-seven cases were of the Laryngeal type of whom 25 required Tracheotomy and of these 17 died, 12 within 24 hours of operation. Many of the "laryngeal" cases were really tracheal as well, the membrane extending far down the trachea. Eighteen of the fatal cases had been ill for a week or more before admission. Nine of the patients were one year old or under, and of these 5 died. Seventy-eight were between 1 and 5 years of whom 25 died. Forty-five were between 5 and 10 years of whom 12 died and 27 were over 10 years of whom 3 died. The nationalities treated were 123 Chinese, 12 Eurasians, 6 Tamils, 6 Malays, 6 Ceylonese, 3 Japanese, 1 Boyanese and 2 Europeans.

Chickenpox. As usual more cases of this disease were admitted than of any other though the number, 252, was only half of last year's.

Measles. One hundred and ten cases were admitted with 5 deaths due chiefly to Broncho-Pneumonia in weakly children. Thirty one cases came from the Poh Leong Kok.

Whooping Cough. This disease is very common but only 8 cases were admitted of whom 3 died. These cases were admitted only because they were very ill, and Broncho Pneumonia accounted for the deaths.

Mumps. There were 178 admissions of which nearly one third were from our own labour force and one quarter were school children.

Typhoid Contacts. Two hundred and eighty-one hawkers were admitted to see whether any of them were excreting the *Eb. typhi* and hence might be the cause of enteric fever among school children. Two were found to excrete the bacillus in the faeces.

Other Diseases. Forty-six persons were admitted suspected to be suffering from one or other of the infectious diseases and found to have some other disease instead. Of these 16 died the causes of death being Broncho-Pneumonia 7, Bronchitis 2, Meningitis 1, Cerebral Oedema 1, Malaria 1, Septicaemia 1, Diarrhoea 1, Lobar Pneumonia 1, Marasmus 1. It is noteworthy that 10 of the 16 deaths were from diseases of the respiratory system and nearly all of these were sent in as cases of suspected Diphtheria. The remainder of the patients were discharged or transferred to the other hospitals.

Nationalities. The patients belonged to the following nationalities:—

Europeans	...	...	79	for	1,416	days
Eurasians	...	...	26	„	261	„
Chinese	...	...	581	„	5,861	„
Malays	...	...	73	„	818	„
Indians	...	...	422	„	4,483	„
Others	...	...	7	„	78	„

The total number of days spent in hospital, including patients remaining from 1932, was 12,917 as compared with 9,830 last year.

The students from the College of Medicine attended the hospital during the year.

The following table shows the admissions to Middleton Hospital during the past ten years:—

Diseases	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Cholera	—	—	16	20	4	—	—	—	—	—
Small-Pox	8	9	30	16	8	9	—	3	7	1
Plague	11	21	1	2	3	—	—	—	—	1
Chickenpox	210	277	155	180	324	553	334	196	491	252
Diphtheria	17	32	25	16	42	38	35	46	90	159
Cerebro-spinal Fever .	13	7	6	14	13	3	17	6	6	3
Influenza	—	—	—	—	—	—	—	2	—	—
Measles	29	49	70	69	94	42	60	58	7	110
Erysipelas	5	2	11	3	6	1	7	1	—	2
Mumps	—	27	47	79	48	66	10	17	22	178
Whooping Cough ..	—	1	6	4	8	1	14	20	3	8
Typhoid Fever ..	—	1	3	1	—	—	1	1	1	—
Tuberculosis ..	—	1	1	—	1	1	1	1	2	3
German Measles ..	21	7	3	18	7	6	5	14	4	1
Scarlet Fever ..	—	—	1	—	3	6	—	—	—	—
Typhus Fever ..	—	—	—	—	1	—	—	1	2	—
Puerperal Fever ..	—	—	—	1	—	—	1	2	—	—
Contacts	—	19	18	42	45	17	48	22	36	357
Other Diseases ..	41	17	32	52	63	63	44	44	55	85
Total ..	355	470	425	517	670	806	577	433	724	1,160

I have the honour to be,

Sir,

Your obedient servant,

COLIN C. B. GILMOUR, M.A., M.B., CH.B.,

Medical Superintendent.

MUNICIPAL HEALTH OFFICE,
SINGAPORE, 25th January, 1934.

THE MUNICIPAL HEALTH OFFICER,
SINGAPORE.

SIR,

I have the honour to submit my 14th Annual Report upon the markets of Singapore, their upkeep and condition and inspection of the foodstuffs sold in them and in the shops of the city.

No new Municipal markets have been built but a private one at 4½ milestone, Bukit Timah Road, was licensed and has been regularly visited. It has not been patronized too well up to the present.

Our own markets have been kept in good trim and when Grange Road Market floor has been relaid and the roofs of Orchard Road Market (old portion) and Clyde Terrace fish section have been renewed this year they can be said to be in a good state of repair.

(A) CLEANSING.

Throughout the year a high standard has been maintained and on Chinese New Year the whole of the stalls were dismantled as usual. Only 5 rats were caught. At Ellenborough, which is a lofty building, we procured the services of the Fire Brigade through the good offices of its chief.

(B) REPAIRS.

Clyde Terrace Market. The floor of the auction area was relaid.

Ellenborough Market (Eating Shed). All the railings were repaired and new wooden gates substituted for the old corroded iron ones.

The zinc covered eating stalls are gradually being replaced by white tiled reinforced concrete ones.

Telok Ayer Market. All the drains are being broken up and regraded, concrete inverts being used. White tiled eating stalls are being installed here too.

Kandang Kerbau Market. The compound flooring has been relaid and carriage ways made good.

Permanent sunshades have been erected in place of the old awnings.

Grange Road and Maxwell Road Markets. All the upright columns and iron roof trusses etc. have been repainted and also the railings and gates.

All Markets. The zinc covered meat tables in all markets are being gradually re-covered with aluminium as they get worn out.

Lighting and water services have been maintained in good order.

(C) UNSOUND FOODSTUFFS.

73,441 catties of unsound foodstuffs, roughly 44 tons, were sent to the incinerator for destruction.

(D) PRICES AND QUANTITIES OF FOODSTUFFS.

About 3,500 pikuls less foodstuffs passed through the markets and of course the equivalent value fell too but average general prices were only very slightly lower than last year. Wet fish sales dropped 18,000 pikuls but meat sales, especially that of beef, show a very great increase, Orchard Road Market alone accounting for 800 pikuls over last year. This I think, shows the public's newly-formed preference for good quality fresh meat. Mutton, as usual, has fluctuated in price during the year with the coming and going of various new companies. At the end of the year, a supplier from W. Australia opened up and seems to be determined to put on the market a mutton for consumption by others than Mohammedans.

The following table shows comparative prices of the chief articles:—

TABLE (A).

ARTICLE	Per	1914 Av. Price	1924 Av. Price	1928 Av. Price	1932 Av. Price	1933 Av. Price
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Beef ..	Kati	.25	.41	.53	.35	.30
Mutton ..	lb.	.35	.62	.55	.36	.33
Pork ..	Kati	.38	.63	.60	.47	.42
Tea ..	„	.50	.92 pkt.	.98 pkt.	.84 pkt.	.83
Coffee beans ..	„	.36	.47	.67	.39	.40
Sugar ..	„	.07	.14	.09	.05	.05
Salt ..	„	.02	.03	.04	.03	.03
Potatoes ..	„	.07	.12	.11	.07	.06
Yam ..	„	.03	.06	.07	.04	.03
Onions ..	„	.06	.09	.11	.06	.05
Ducks ..	Dozen	6.00	9.60	10.20	6.00	6.00
Pigeons ..	Pair	.75	1.10	1.20	.80	.78
Eggs (hens) ..	Dozen	.30	.52	.55	.39	.31
Capons ..	Kati	.42	.73	.91	—	—
Fowls ..	Each	.55	.53	1.85	.70	.60
Rice ..	Gantang	.33	.57	.45	.28	.25

From the above table it will be noted that nearly all prices show a slight fall.

REVENUE (TABLE B).

MARKET	1929	1930	1931	1932	1933
Clyde Terrace ..	\$175,941.98	\$163,492.65	\$135,399.03	\$120,583.78	\$107,441.29
Ellenborough ..	116,722.59	108,947.37	93,524.63	80,176.91	69,124.92
Telok Ayer ..	29,208.30	29,290.31	27,250.93	23,210.57	20,167.00
Orchard Road ..	14,090.50	13,927.50	15,962.00	14,814.50	14,086.50
Kandang Kerbau	19,651.00	18,892.00	18,811.50	18,617.00	17,302.00
Grange Road ..	2,130.00	2,628.00	2,247.00	1,850.00	1,662.00
Geylang ..	} 3,979.00	3,919.00	577.00	Abolished	—
Sims Avenue ..		1,345.00	4,034.00	4,288.50	4,103.50
Maxwell ..	11,904.00	449.00	9,152.00	8,280.00	7,259.50
Peoples Park ..	13,889.00	14,176.00	13,254.50	12,936.00	9,752.50
Joo Chiat ..	3,120.00	3,350.00	3,178.00	1,288.00	545.50
Total ..	\$390,636.37	\$360,416.83	\$323,390.59	\$286,045.76	\$251,444.71

5% Commission on Fresh Fish Sale.

MARKET	1928	1929	1930	1931	1932	1933
Clyde Terrace ..	\$107,983.64	\$120,051.98	\$110,660.65	\$ 84,582.03	\$ 73,861.78	65,787.79
Ellenborough ..	72,703.26	71,866.59	64,071.37	50,016.13	40,069.91	32,919.92
Telok Ayer ..	2,330.87	1,903.30	1,462.31	1,037.93	† 490.07	abolished
Total ..	\$186,017.77	\$193,821.87	\$176,194.33	\$135,636.09	\$114,421.76	\$98,707.71

† 11 months only.

For the second year in succession record has to be made of decrease in every market. Business has been very bad and firms have cut expenses to the lowest. Failure to collect debts has caused many to seek relief in bankruptcy or return to China where living is said to be much cheaper.

5% Commission has fallen too as the better class fish has not found favour. I have had a table prepared which will clearly demonstrate for Clyde Terrace Market how the cheaper kinds of fish only show increases. The + or — signs at the foot of the table with the percentages speak for themselves.

GENERAL.

One half of Peoples Park was handed over to the Superintendent Town Cleansing and the whole gazetted as a public market.

(90-D)

Several visitors from neighbouring towns and countries were shown around the markets and supplied with every information. They expressed unfeigned surprise at their orderliness.

RETURNS.

The following returns are supplied regularly as stated below:—

Weekly. Price lists to Press, Registrar General of Statistics, etc.

Monthly. Total catch of fish to Fisheries Officer, Average monthly prices to Registrar General of Statistics.

Quarterly. Stock of foodstuffs in markets on 1st day of each quarter to Registrar General of Statistics.

Lectures in the markets were given to the Medical students and candidates for the Royal Sanitary Institute Certificate.

TOWN.

44,784 cases etc. of unsound foodstuffs were collected from stores in town and conveyed to destructor.

I conducted surveys of numerous different kinds of foodstuffs and instructed owners as to their disposal.

Details of samples taken will be found in Municipal Analyst's report.

I attach a return of the amount of foodstuffs passing through the markets, with their approximate value, the quantity of unsound foodstuffs destroyed and a summary of vacant stalls at the end of the year.

I have the honour to be,

Sir,

Your obedient servant,

M. N. MACMAHON,

Cert. R. San. Inst.,

Food and Market Inspector.

RETURN OF SOME OF THE FOODSTUFFS PASSING THROUGH MARKETS DURING 1933.

Market.	Wetfish ctts.	Boiled Fish ctts.	Shell Fish ctts.	Beef ctts.	Mutton ctts.	Pork ctts.	HEADS					Bean Cakes ctts.	Bean Sprouts ctts.	Approx. Value \$ cts.
							Fowls	Capons	Geese	Ducks.	Pigeons.	Turkeys		
Clyde Terrace ..	13,537,578	48,456	129,070	377,176	245,165	409,912	41,561	..	1,343	21,617	3,313	..	22,410	1,794,037 40
Ellenborough ..	3,732,797	10,001	171,020	14,131	..	492,203	22,434	1,135	2,867	22,160	..	..	37,590	892,986 69
Telok Ayer ..	46,605	..	51,080	22,672	35,565	174,672	35,374	..	590	10,327	1,548	161	..	136,854 85
Kandang Kerbau ..	946,736	29,302	29,234	185,778	182,005	498,385	91,498	168	..	9,750	..	..	..	538,281 09
Orchard Road ..	703,706	24,361	..	231,541	24,134	399,312	71,638	110	147	4,546	5,480	23	40,366	429,303 90
Total ..	18,967,422	112,120	380,404	1,031,298	486,869	1,944,484	262,505	1,413	4,947	68,400	10,341	184	100,366	3,791,463 93

M. N. MacMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

UN SOUND FOODSTUFFS DESTROYED DURING 1933.

Market.	Wetfish ctts.	Saltfish ctts.	Beef ctts.	Mutton ctts.	Pork ctts.	Vegetables ctts.	Fruits ctts.	Tinned Goods.		Bottles preserves No.	Eggs No.	Miscella- neous	Total Items.
								Cases.	Tins.				
Clyde Terrace ..	41,605	1,154	61	..	..	8,267	2,328	..	15	..	271	285	
Ellenborough ..	6,093	259	..	..	142	1,190	105	..	..	..	221	2,081	
Telok Ayer ..	10	..	..	..	..	1,280	3,934	..	..	..	87	9	
Kandang Kerbau ..	..	..	..	..	..	251	87	..	..	..	..	..
Orchard Road ..	142	..	7	4	..	987	2,163	..	..	..	35	14	
Other Markets ..	..	..	1	..	87	138	103	..	..	..	..	25	
	47,850	1,413	69	4	229	12,113	8,720	..	15	..	614	2,414	73,441
Town ..	1,088	12	13,001	7,333	1,630	..	345	1,135	12,203	302	..	7,735	44,784
Total ..	48,938	1,425	13,070	7,337	1,859	12,113	9,065	1,135	12,218	302	614	10,149	118,225

M. N. MacMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

SUMMARY OF VACANT STALLS END OF DECEMBER 1933.

	Clyde Terrace. No.	Ellenborough. No.	Telok Ayer. No.	Orchard Road. No.	Kandang Kerbau. No.	Maxwell Road No.	Joo Chiat. Road No.	Grange Road. No.	Peoples Park. No.	Sims Avenue. No.
Dry Goods	24	3	1	1	..	11	5	..	..	2
Beef	5	..	..	..	..	5	5	6	..	1
Salted Vegetables .. ..	..	..	..	..	..	2	2	..	..	2
Mutton	2	..	2	1	..	1	5	..	..	1
Pork	4	4	6	3	1	13	7	1	6	3
Curry Stuff .. ..	..	..	..	..	..	..	..	..	..	..
Bean Cakes .. ..	..	..	..	2	..	7	3	..	..	1
Poultry	13	21	3	1	..	14	1	..	3	2
Vegetables and Fruits	22	20	24	12	10	31	13	6	..	15
Eggs .. ..	..	..	..	2	1	4	2	..	1	..
Money Changer	1	..	..	..	..	1	..	..	..	..
Eating .. ..	..	1	6	..	..	..	..	..	..	..
Fish	8	21	2	13	..	30	32	9	..	3
Shell Fish .. ..	..	..	..	..	..	..	...	..	11	..
Hawkers .. ..	..	12	..	..	..	..	1	..	..	...
Provisions .. ..	..	..	..	1	..	..	..	3	..	..
Dressed Ducks *	1	82	..	..	..	* 3	..	..	..	..
TOTAL ..	80	266	44	36	12	122	76	25	21	30

M. N. MacMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

CLYDE TERRACE MARKET. WEIGHTS OF FISH FOR THE YEAR 1932.

	Papan	Parang	Tenggiri	Terubok	Kuroe	Merah	Krapu	Sotong	Belianak	Selah	Bertimon	Chencharu	Yu	Prawns	Tongkol	Delah	Bawal Puteh	Mixed Fish	Gulama	Total	Amount Sold
	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	Piculs etts.	\$ cts.
January	137 50	1,083 45	619 12	263 06	977 56	198 44	162 59	65 48	25 88	95 39	18 95	20 15	484 63	378 65	60 00	6,257 10	81 32	561 78	93 05	11,584 10	142,915 00
February	82 41	1,137 63	689 43	258 57	1,019 23	205 44	144 87	68 69	20 84	48 09	19 86	18 26	455 39	370 19	234 50	6,564 44	77 69	566 10	153 03	12,134 66	123,944 00
March	166 00	1,392 02	707 71	281 09	1,103 27	217 35	191 92	81 84	22 36	75 42	16 48	12 85	477 63	453 74	138 50	6,845 22	84 22	739 31	506 45	13,513 38	132,019 60
April	129 32	1,180 08	634 80	271 97	1,013 87	197 85	165 54	57 10	18 54	55 81	17 83	16 48	477 56	392 23	110 50	8,129 16	100 74	632 59	140 00	13,741 97	123,069 20
May	136 50	1,308 62	608 43	284 32	1,050 58	204 78	167 49	64 38	20 34	54 01	20 95	18 54	589 49	400 50	187 00	5,494 40	90 05	761 94	..	11,462 32	117,965 60
June	40 79	1,418 33	590 38	157 25	541 29	145 23	49 76	91 08	26 70	132 85	80 61	32 82	589 38	557 19	424 50	4,722 20	111 02	1,375 02	..	11,086 40	118,788 80
July	55 10	1,510 80	665 49	164 64	286 22	36 09	43 51	92 86	17 49	159 84	71 61	21 89	228 98	850 80	424 48	4,838 95	41 74	1,206 57	..	10,713 06	121,351 00
August	80 91	885 78	835 03	498 95	229 29	57 98	36 30	121 40	22 27	51 60	53 77	19 96	140 40	662 46	279 40	6,605 15	68 04	1,466 37	..	12,115 06	126,419 80
September	95 18	1,061 88	903 36	612 60	237 65	61 02	28 10	83 50	29 83	126 78	48 04	39 88	341 21	591 41	223 13	6,263 50	26 85	1,446 25	..	12,220 17	119,392 80
October	65 19	986 78	736 44	585 95	233 19	43 66	30 47	55 74	25 87	62 44	45 14	7 93	323 32	564 15	254 56	6,496 23	52 66	1,406 06	..	11,975 78	116,571 20
November	30 71	894 40	590 69	476 04	185 70	40 53	25 17	71 72	18 99	183 36	24 16	38 22	316 02	675 43	247 09	7,635 03	31 04	1,372 85	..	12,857 15	117,793 20
December	20 71	845 16	661 35	308 89	197 67	72 60	18 96	68 41	20 85	512 72	19 98	63 71	436 45	806 66	161 55	7,974 20	46 70	1,737 78	57 52	14,031 87	117,065 40
	1,040 32	13,704 93	8,242 23	4,163 33	7,075 52	1,480 97	1,064 68	922 20	269 96	1,558 31	437 38	310 69	4,860 46	6,703 41	2,745 21	77,821 58	812 07	13,272 62	950 05	147,435 92	1,477,235 60

WEIGHTS OF FISH FOR THE YEAR 1933.

January	47 16	596 42	396 12	219 97	303 61	99 47	25 97	72 14	25 48	326 13	12 24	26 07	261 32	770 50	328 82	9,507 44	19 74	1,343 36	126 64	14,508 60	108,360 00
February	135 45	846 39	536 21	397 01	239 26	77 55	27 91	66 47	18 30	96 19	12 55	185 26	468 81	510 81	155 05	6,019 83	33 96	1,437 07	185 59	11,449 67	100,273 00
March	150 01	960 26	713 80	441 10	309 76	87 26	56 89	97 07	22 40	40 14	40 71	115 87	383 55	944 88	362 86	6,028 36	76 49	1,247 78	227 70	12,306 89	110,458 60
April	94 51	909 51	714 46	457 44	294 66	86 91	70 70	130 08	31 42	48 19	69 74	31 87	361 03	725 24	281 80	6,301 88	172 96	1,216 51	78 47	12,077 38	104,880 80
May	30 42	556 48	362 95	270 23	209 43	70 05	72 36	102 74	46 71	119 30	87 58	4 52	224 42	757 02	123 16	7,613 19	96 94	1,598 40	..	12,345 90	101,847 60
June	102 60	348 85	255 16	99 70	305 76	58 96	60 86	86 73	27 04	103 81	82 77	28 27	109 57	841 52	59 46	4,975 11	45 83	1,501 01	..	9,093 01	93,718 40
July	413 25	661 88	598 01	537 44	336 79	72 26	42 74	76 19	25 88	117 69	72 18	17 16	98 20	705 14	400 35	4,849 02	16 58	1,233 61	..	10,274 37	113,142 40
August	352 27	687 32	575 94	410 41	251 07	38 64	31 20	71 30	34 33	95 34	48 13	14 73	103 83	624 62	266 00	4,366 88	56 73	1,416 55	..	9,445 29	114,499 60
September	353 40	833 51	785 39	265 61	223 95	51 15	33 42	68 75	36 88	87 19	30 18	7 28	325 07	685 61	397 65	4,899 74	31 22	1,241 72	..	10,357 72	115,096 40
October	348 34	991 74	566 56	312 85	201 20	47 48	34 62	69 36	27 30	49 44	41 44	3 74	248 86	658 04	218 40	6,056 80	52 28	1,271 67	..	11,200 12	118,150 60
November	166 41	688 68	354 56	285 87	169 51	69 79	25 40	53 39	22 91	187 37	21 27	21 55	191 30	850 46	88 25	6,167 51	22 51	1,244 81	23 21	10,654 76	111,166 60
December	253 36	830 12	488 73	341 72	332 19	46 11	30 15	73 25	44 95	210 85	30 41	19 77	227 45	907 35	231 25	6,218 35	17 63	1,173 61	184 82	11,662 07	124,161 80
	2,447 18	8,911 16	6,347 89	4,039 35	3,177 19	805 63	512 22	967 47	363 60	1,481 64	549 20	476 09	3,003 41	8,981 19	2,913 05	73,004 11	642 87	15,926 10	826 43	135,375 78	1,315,755 80
	+ 140%	— 30%	— 25%	— 3%	— 56%	— 49%	— 55%	+ 5%	+ 25%	— 5%	+ 20%	+ 33%	— 36%	+ 25%	+ 7%	— 6%	— 20%	+ 20%	— 12½%		

RETURN OF NOTICES SERVED AND COMPLIED WITH ETC., DURING THE YEAR, 1933.

NATURE OF NOTICE.	Brought forward from last year.	Served during the year.	Total.	Complied with during the year.	Carried forward to next year.	REMARKS.
Limewash Notice	35	2,218	2,253	2,171	69	13 Cancelled
Intimation Notice	154	567	721	543	75	103 "
Nuisance Notice	10	220	230	221	3	6 "
Well Notice	—	172	172	141	15	16 "
Latrine Notice	—	92	92	68	—	24 "
Anti-Mosquito Notice	2	84	86	75	7	4 "
Abatement Order	36	2	38	2	36	
Drain Notice	—	1	1	1	—	
Demolition Order	—	1	1	1	—	
Total	237	3,357	3,594	3,223	205	166 Cancelled

(95-D)

H. BENJAFIELD,
Chief Sanitary Inspector.

Return of Licences Issued under the Offensive Trade By-Laws for the Year 1933.

[illegible]

Return of Licences Issued under the Offensive Trade By-Laws for the Year 1933.—(Contd.)

NATURE OF LICENCE.		Per Annum \$	Number Issued.	CASH RECEIVED		DETAILS OF LICENCES ISSUED										For One Year	For One Month	For 2 Months	For 3 Months	For 4 Months	For 5 Months	For 6 Months	For 7 Months	For 8 Months	For 9 Months	For 10 Months	For 11 Months
					\$ cts.																						
CATTLESHEDES:							423	1,607	34																		
	Brought forward	..																									
9 Animals and Under per head @	..	1	5	44	00																						
10—14 Animals	..	10	1	10	00																						
15—24 "	..	15	..	..																					
25—50 "	..	25	5	106	25																						
Over 50 "	..	50	5	229	19																						
PONYSTABLES:																											
9 Animals and Under per head @	..	1	3	9	00																						
10—14 Animals	..	10	..	..																					
15—24 "	..	15	..	..																					
25—50 "	..	25	..	..																					
Over 50 "	..	50	..	..																					
COWSHEDS:																											
9 Animals and Under per head @	..	1	..	..																					
10—14 Animals	..	10	..	..																					
15—24 "	..	15	..	..																					
25—50 "	..	25	..	..																					
Over 50 "	..	50	..	..																					
9 Animals and Under per head @	..	1	..	..																					
10—14 Animals	..	10	..	..																					
15—24 "	..	15	..	..																					
25—50 "	..	25	1	25	00																						
Over 50 "	..	50	2	100	00																						
TOTAL		..	445	\$2,130	78																						

HEALTH DEPARTMENT.

Return of Prosecutions for Year ending 31st December, 1933.

OFFENCES.		TOTAL					Fines \$ cts.
		Prosecutions	Withdrawn	Not Served	Convictions		
Municipal Ordinance 135.							
Establishing a private market	...	Section 191	1	—	1	—	
Unlicensed Offensive Trades	...	" 204	63	10	47	415 00	
Latrine etc. notice not complied with	...	" 212	1	—	1	4 50	
Nightsoil kept for more than 48 hours	...	" 216	—	—	—	—	
Filthy premises	...	" 226	39	—	39	284 50	
Limewash notice not complied with	..	" 227	3	—	3	8 00	
Filthy water closet	..	" 226	26	1	22	81 00	
Non-compliance of notice of demolition order of insanitary dwelling	...	" 229	1	1	—	—	
Allowing premises to be overcrowded	...	" 230	1	—	1	4 50	
Non-compliance with Nuisance Notice	...	" 239	6	1	5	27 50	
" " Order	...	" 240	36	1	35	—	
" " Closing Order	...	" 240	2	—	2	9 00	
Opening Well without permission	...	" 247	1	1	—	—	
License not exhibited	..	" 371	3	—	2	4 50	
Carried forward ..			183	9	16	838 50	

HEALTH DEPARTMENT.

Return of Presecutions for Year ending 31st December, 1933—(Contd.)

OFFENCES.		TOTAL.				Fines \$ cts.
		Prosecutions	Withdrawn	Not Served	Convictions	
<i>Brought forward</i> ..		183	9	16	158	838 50
Byelaws-Sections 57 & 204 M. O. 135.						
Unlicensed Foodshops	...	312	24	52	236	1,622 —
„ Milk Vendors	...	189	15	1	173	1,024 50
Recovery of Daily fines	...	8	1	2	5	86 50
Employing women without permission of H. O.	...	154	4	11	139	1,194 00
Unlicensed Piggeries	...	117	1	11	105	617 00
Filthy Stables, Cowsheds etc.	...	4	—	—	4	26 00
Breaches of the Foodshop Byelaws	...	140	4	5	131	650 50
Carrying on a business during prohibited hours	...	24	—	2	22	221 00
Markets and Slaughter Houses.						
Unsound Food	... Section 192	3	1	—	2	16 00
Slaughtering Animals except in Abattoirs	... „ 197	11	1	7	3	38 50
Market Byelaws	...	23	—	1	22	109 00
<i>Carried forward</i> ..		1,168	60	108	1,000	6,443 50

HEALTH DEPARTMENT.

Return of Presecutions for Year ending 31st December, 1933—(Contd.)

OFFENCES.	TOTAL				
	Prosecutions	Withdrawn	Not Served	Convictions	Fines
					\$ cts.
<i>Brought forward</i> ..	1,168	60	108	1,000	6,443 50
Sale of Food and Drugs Ordinance No. 139.					
Selling Adulterated Milk	29	—	—	29	772 00
” Milk deficient in fat	5	—	—	5	91 50
” Adulterated Whisky	1	—	1	—	—
Q. and P. Disease Ordinance No. 157.					
Failing to have child vaccinated	351	12	35	304	—
Registration Births and Deaths Ordinance No. 59.					
Failing to Register Births	69	3	—	66	22 50
Destruction of Mosquitos Ordinance No. 174.					
Failing to comply with notice	4	—	—	4	45 50
Selling human food in an Unlic. Private Market	51	—	5	46	—
Selling Green Peas containing crystallized Copper Sulphate	3	—	—	3	53 50
	1,681	75	149	1,457	7,427 50

Summary.

Total	Inspections	...	...	43,427
”	Prosecutions	...	...	1,681
”	Withdrawn	...	...	75
”	Not Served	...	...	149
”	Convictions	...	...	1,457
”	Fines	...	...	\$7,427/50

H. J. BENJAFIELD,
Chief Sanitary Inspector.

N.B.—Costs are not included in the amount of fines.

